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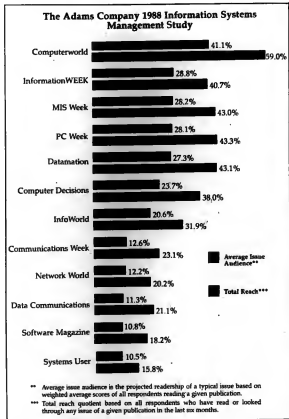
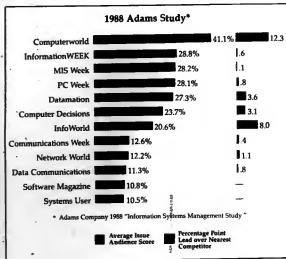
388

SECOND CLASS MAIL

Computerworld has been named the best-read publication by America's MIS executives. Again.

The Adams Company 1988 "Information Systems Management Study" reveals that *Computerworld* leads all other IS/communications publications in regular readership. And *Computerworld* outdistanced its nearest competitor by more than 12 percentage points.

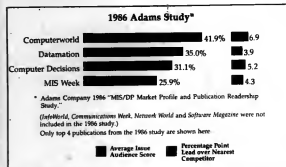
Shown below are average issue audience and total reach scores for the 1988 Adams Study. Breakouts by selected job function and by selected purchasing influence are given on the inside back cover.



More than 3,000 information systems professionals were asked how many issues of the studied publications they read or looked through in the last six months. They were also asked how many of the last four issues they read or looked through. *Computerworld* was the clear winner, having an average issue audience of over 41% of all respondents and a total reach of nearly 60%!

But, as other independent studies reveal, this is not surprising. The *Wall Street Journal* "Survey of the Information Processing Marketplace," November 1987, showed *Computerworld* to be the best-read publication overall, as well as best-read among every subgroup — including MIS management, non-technical management, top management and middle management.

And two years ago, The Adams Company 1986 "MIS/DP Market Profile and Publication Readership Study" also showed *Computerworld* leading the pack by more than six percentage points over the second-place publication.



Computerworld's proven ability to reach America's MIS departments is especially important to you because MIS directly controls 80% of the \$192 billion U.S. information systems market. To learn more about these studies and how *Computerworld* can put you in touch with America's information systems buyers, call your *Computerworld* sales representative today. Or call Val Landi, Vice President/Associate Publisher, at (508) 879-0700.

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COMPUTERWORLD

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Profile: Toronto manager serves up database services to subscribers virtually around the clock. Page 87.

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No more clipboards at Atlanta hospital when doctors and nurses go on-line one year from now. Page 23.

John Cunningham's gamble pays off as Computer Consoles sells out to British computer and communications giant. Page 95.

Met rings in remote sites

Insurer's unique Token-Ring network pays off

BY PATRICIA KEEFE
OF STAFF

GREENVILLE, S.C. — Get a remote Token-Ring. It pays. At least that is the experience of Metropolitan Life Insurance Co. The organization is currently reaping benefits from a first-time-ever adaptation of IBM's Token-Ring network that is configured to speed up the insurance carrier's remote data entry operations.

The unique implementation provides the key to a significant reduction in network operating costs, higher productivity and faster response times by eliminating equipment and providing a more direct link to an IBM 3090 host.

The insurance carrier has not only cut an already fast response time virtually in half but in processing more orders than ever before (see chart page 121).

Thomas Walz, manager of the firm's Greenville computer center, which supports the heaviest part of the company's on-line network, was more specific: "Today, 50% of all transactions are done under one second, whereas prior to the Token-Ring implementation, about 8% were done under a second." That is equivalent to those units being directly attached locally to the host, he said.

These achievements are mostly chalked up to a little entrepreneurship and a willingness

Continued on page 121

TREND SETTERS

Lowe exits IBM despite recent PS/2 gains

BY DOUGLAS BARNEY
OF STAFF

His resignation drew to a close a 26-year IBM career and marked the end of a reign that spanned from a time when IBM led the microcomputer industry around by its nose to its current period of vulnerability.

In a move last week that helped usher in a major IBM shake-up, William C. Lowe, former president of IBM's Entry Systems Division, resigned to become executive vice-president of \$15 billion Xerox Corp. Lowe was unavailable for comment.

Reaction to Lowe's replacement by a Data Systems Division executive was subdued. At large IBM accounts, managers expressed the view that IBM's PC strategy overshadows executive personalities (see story page 6). Lowe was there at the beginning of the IBM Personal Computer, having hired the flamboyant Philip "Don" Estridge to spearhead the entrepreneurial-

styled team that pioneered the pivotal PC. That, many say, is one of the many things Lowe did right. It also may have been the most important moment in PC history.

Just prior to that well-chro-

Feds sign FTS 2000 net pact

BY MITCH BETTS
OF STAFF

WASHINGTON, D.C. — AT&T and U.S. Sprint Communications Co. are poised to become the U.S. government's long-haul voice and data carriers for the 1990s after winning a 10-year contract for an all-digital private network called Federal Telecommunications System 2000 last week.

The high-visibility contract is estimated to be worth \$3 billion to \$15 billion, depending on how many federal agencies sign on to FTS 2000 and how many fight to

stay off the centralized network. FTS 2000 is to be phased in over three years, with the first users to be switched over in late 1989 and all 1.3 million federal users on-line by 1991, the General Services Administration said.

It reportedly will offer federal employees services such as electronic mail, packet switching, switched data service, dedicated transmission services, video transmission and, eventually, integrated Services Digital Network capabilities.

Survival, then rival If the contract survives possible challenges from losing bidders, the next battle will be between the GSA and the individual agencies that want to run independent data networks, analysts said. For example, the Department of Defense has argued that its requirements for network security are unique and cannot be handled by FTS 2000.

The U.S. Congress has ordered all federal agencies to use FTS 2000 unless they obtain a waiver from the GSA. Agencies that are planning new data networks will be required to join FTS 2000, but those with existing networks may get exemptions, said Michael Hashemi, president of Telesystems Corp., a Fairfax, Va.-based telecom-

Continued on page 4

IN DEPTH: MIS STRATEGIES

American Express sets own limits

BY JAMES CONNOLLY
and ELIZABETH HORWITT
OF STAFF

American Express Co. spends an estimated \$1 billion per year on information technology, yet the firm opts for the low-tech approach of hiring financial planners at with pencil and paper at a client's kitchen table.

Like their peers in other companies, American Express information systems executives call technology a key to their strategy. But they also fight to avoid the trap of using technology for technology's sake.

"The management team appreciates technology — but in terms of serving the custom-

er," American Express President Louis Gerstner says.

American Express is among AT&T's and IBM's largest customers, with worldwide networks serving the modern

mainframes and producing acclaimed customer statements through sophisticated image processing and laser printing. Despite this, the company's IS executives speak of having to balance high-tech with high touch.

Elite group To examine American Express' IS operation is to look at a tiny corporate consulting group of nine people. One then takes individual views of massive systems operations in subsidiaries such as American Express Travel Related Services Co., IDS Financial Corp., Shearson Lehman Hutton, Inc. and American Express Bank Ltd.

Ask the IS managers in
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President Louis Gerstner

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"I T PLEASES me that we have an industry that is mature enough to deal with threats from corporate predators and to address the needs of users for ongoing support and viability at the same time."

DAVID BINKA
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NEWS

Airport relief on way

FAA to curtail O'Hare traffic, ease system strain

BY JEAN S. BOZMAN
OF STAFF

CHICAGO — The Federal Aviation Administration moved last week to slow things down here at O'Hare International Airport, where aging computer and communications systems have hampered the airport's ability to cope with increasing air traffic.

Underlying O'Hare's problems is a crumbling infrastructure of 18-year-old computer systems, out-of-date communications systems and unreliable radio systems, according to an FAA report released Oct. 26. During a three-day period this fall, there were five near-misses in O'Hare's airspace.

Seven major carriers, including Chicago-based United Airlines, are set to meet this week with FAA officials in Washington, D.C., to discuss the revision of airline timetables.

Just how serious the problems are became apparent Aug. 1, when O'Hare's aging ARTS III Univac computer failed during an overnight software upgrade. The early-morning failure removed aircraft labeling from controllers' radarscreens, delaying hundreds of flights a day's 2,300 flights [CW, Aug. 8].

The FAA report graphically depicted the aging of O'Hare,

where systems are typical of those installed at other large airports. One passage, for example, faulted extremely old radio beacon decoders as contributing to the failure of the ARTS III computer. "Extra attention to this equipment is required because the equipment is vacuum-tube technology; therefore, it is subject to drift and instability," the FAA report said.

The FAA report contains dozens of recommendations for improving O'Hare's control systems. Among the planned projects, many of them not yet funded, are the following:

- A low-density microwave network that would replace land-based lines provided by the local telephone companies.

- A two-way radio-based system that would automatically update the departure schedules in airline-owned mainframes.

- A major software upgrade that would replace the ARTS III computers in O'Hare's tower.

Sen. Paul Simon (D-Ill.), whose Senate resolution forced the issuing of the FAA action plan, remains critical of the pace of change. The tower at O'Hare, Simon said recently, needs major investments "from its leaky roof to the outdated computers in its basement."

FBI system escalation lacks funds

BY J. A. SAVAGE
OF STAFF

SAN FRANCISCO — Efforts by special interest groups to rein in the Federal Bureau of Investigation's expansion of its database system for the National Crime Information Center (NCIC) have been effectively accomplished because Congress has not been inclined to authorize the \$56 million needed for the job.

NCIC is used mainly by police officers to check the identity of suspects; missing persons and stolen vehicles.

At its semiannual meeting last week, NCIC's Advisory Policy Board made few decisions affecting the breadth of the FBI's database — a controversial topic because some police organizations initially wanted it linked with other large databases such as those at airline reservation terminals and credit card companies. This drew the ire of the American Civil Liberties Union

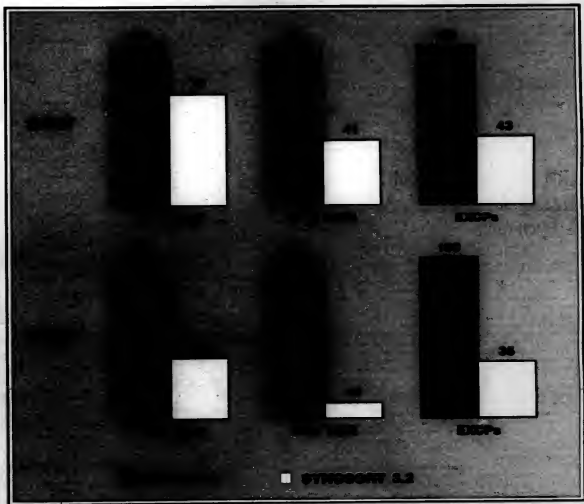
(ACLU) and Computer Professionals for Social Responsibility (CPSR).

O'Hare plans Gray Backley, chairman of the policy board, which is composed of law enforcement representatives from each state, said that those controversial areas were eliminated a year ago. This year, the group is more interested in selling the FBI and Congress on its final plan, called NCIC 2000, and is trying to use its leverage to fund the project either through the next federal budget or by rearranging the FBI's priorities.

The FBI and the board agree on most of the plan but still disagree on what level of data security is appropriate, such as authentication or encryption. The board overwhelmingly rejects those levels of security on some files.

The ACLU and CPSR are not convinced that a new system will protect citizens' rights, primarily because the system is only spelled out in the budget, not in any laws. "We're concerned that the database could be funded in one way and constructed in another," said Gary Chapman, director of CPSR. That group is attempting to put the database under statutory authority.

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Lowe exits

FROM PAGE 1

ridge was reassigned. Later that year, a plane crash claimed Estridge's life. Lowe oversaw the final transition of the division from a flimsy upstart to a mature business unit founded on a more solid business model.

During Lowe's absence from Entry Systems, he was fortunate to avoid responsibility for a number of blunders. The ill-fated IBM PCjr — which debuted in November 1983 only to be ridiculed for its shabby keyboard and incompatibility — was Estridge's machine. The Portable PC, announced in February 1984, failed because of incompatibilities and lack of expandability. It, too, was Estridge's machine. The IBM 3270 PC, another Estridge machine introduced in October, 1985, failed because of compatibility problems.

Estridge, however, did reap the credit for the IBM PC AT, introduced in August 1984. Despite some early hard-disk reliability problems, the AT went on to become a raging success, and Estridge is still highly regarded for his PC accomplishments.

Lowe learned a few lessons from Entry Systems Division lemons and plotted a course for which software compatibility was not a goal but a prerequisite. It was this issue of software compatibility that led to a decline in IBM's market share. By the mid-1980s, most clones could run the majority of PC-DOS applications and do so more cheaply than IBM PCs. As a result, IBM slowly lost market share, and Lowe slowly lost his seat.

Under Lowe's tutelage, IBM made a bold move in April 1987 aimed at recapturing PC leadership. It introduced the Micro Channel Architecture, an incompatible and unaccepted bus structure that placed Lowe into the center of a raging controversy. Competitors ridiculed the architecture and the use of 3½-in. floppy disk drives for the incompatibility they brought with virtually no added benefit.

But Lowe and IBM hung tough. Meanwhile, IBM lost more market share because of inordinate customer confusion and reluctance to part ways with the old AT bus.

Lowe calmly took it on the chin as the Micro Channel struggled for position. He also stood calm earlier this year when speculation arose that he would leave under pressure or be reassigned. Grit for the rumor mill was that Lowe had been passed over for promotion.

"He was hung out to dry by everyone," noted Esther Dyson, editor and publisher of "Release 1.0," an industry newsletter.

IBM was not thrilled with the coverage. Terry R. Lautenschach, senior vice-president and general manager of IBM United States, sent personal letters in support of Lowe to key publicists.

SUDDENLY, the concept of the Micro Channel was legitimized, and Lowe's stubbornness started to pay off. Errors of the past began to pale.

But a few months later, Lowe was gone. The question of why remains.

According to a Xerox spokesman, the firm approached Lowe to discuss employment, and Lowe still had opportunities at IBM.

IBM declined to make executives available to discuss Lowe's departure. But after an initial company announcement of the Entry Systems reorganization included only a one-line reference to Lowe, saying he had resigned.

Later, Lowe issued a statement, praising Lowe and wishing him well.

Many analysts said they see the Xerox position as a step up, offering Lowe a chance to have a greater impact on development.

Ironically, Lowe left IBM just as he was on the verge of vindication, observers said. Some 19 months after the Personal System/2 introduction, things began

to turn around, giving the Micro Channel — and Lowe's prestige — a big boost. In September, nine PC clone vendors announced plans to develop a bus designed to mimic key functions of the Micro Channel without the incompatibility.

Suddenly, the concept of the Micro Channel was legitimized,

and Lowe's stubbornness started to pay off. Errors of the past, such as pulling the PC AT off the market too soon, began to pale. Lowe was suddenly back in the limelight, giving speeches and attracting shouting critics.

Vindication

"On a number of issues, he has been or will be vindicated," said James P. Sutter, vice-president and general manager of information systems at Rockwell International Corp. Sutter worked with Lowe as a member of the IBM Customer Council.

Occasionally cast but a vestigially straight talker, Lowe appeared to be the consummate IBM executive.

While some have questioned his judgment, one thing that has never been questioned is Lowe's integrity. His mother, whom Lowe reportedly calls every Sunday, would likely verify that, as would Rockwell's Sutter. "He impressed me as a much more direct guy, as opposed to some of the more melodramatic marketing types. He was sincere," Sutter said. "He comes off as one of the good guys."

IBM reshuffle means little change to users

BY WILLIAM BRANDELL
CHICAGO

The long-anticipated departure of IBM's primary Personal Computer executive, William Lowe, cannot tell a stir among the company's large user accounts last week, with most customers voicing the conviction that product strategy overshadowed any executive reshuffling.

But some of those key customers also expressed the hope that the replacement of the low-end systems president by James Cannavino will accelerate the pace at which IBM brings to market key products that realize its stated strategy.

Cannavino, former president of IBM's Data Systems Division, takes the helm of IBM's most visible department, which produces AT- and Micro Channel-based machines. Responding to the structural realignment, some of IBM's biggest customers and industry analysts said Cannavino will continue Lowe's PC-to-mainframe integration charter and usher in the era of lower cost coprocessing PC products to interactively share data with the host system.

"If anything, this move could signal a viable, identifiable effort on IBM's part to move more quickly," said James Sutter, MIS director at Rockwell International Corp. in El Segundo, Calif. "Their present strategy will move forward."

But IBM's current strategy is causing confusion among its customers as the company pushes the Micro Channel without ex-

plaining its specific role in Systems Application Architecture, said Elaine Bueber, a senior information systems management consultant at GTE Services Corp. in Stamford, Conn. As IBM inserts AT-based PCs with its Micro Channel product announcements, it only compounds the confusion as to which PC will



JAMES CANNAVINO

have what role is the mainframe environment.

"I see no definite strategy as to where their low-end is going," Bueber said. "At the AS/400 announcement, they just started the issues. Now, they just keep saying, 'It's important, it's important, it's important.'"

"I'm a little uncomfortable," said Tom Pettybone, vice-president of information systems at New York Life Insurance Co. in New York. "We are going with the Micro Channel, as it is the only way to successfully run multitasking software efficiently and quickly. But how this will interface to the mainframe is a different kettle of fish."

IBM responses

An IBM spokesman responding to customers' impatience said IBM is "aware of the customers' interest in that area."

IBM chose Cannavino to head the low-end systems division because his mainframe development background will be instrumental in integrating the Personal System/2 to its role as an integrated mainframe extension, said Clare Fleig, director of research at International Technology Group, a market research firm located in Los Angeles, Calif. Ironically, the same reasoning was applied to Lowe's appointment three years ago.

IBM also announced last week that it has broken out its Advanced Engineering Systems within the Engineering Systems Division into a separate entity, now called the Advanced Workstation Group.

The Utah-based division will be headed by Nicholas Donatelli, former vice-president of development in IBM's Entry Systems Division. The division's mission will be to develop a "third product line" ranging from the PS/2 to 3090 mainframes, according to an IBM spokesman.

25,000 reasons to celebrate

BY CLINTON WILDER
and ROSEMARY HAMILTON
CHICAGO

IBM must be feeling pretty good right now — at least in the mid-range market. The company said last week it shipped its 25,000th Application System/400 unit at the end of November.

At the First Boston Corp. technology conference in Boston last week, IBM Vice-President Stephen Schwartz revealed that a surprising 30% of AS/400 shipments have gone to customers outside the System/36 and 38 installed base. Schwartz said this was a higher percentage than IBM had expected.

In response to a later question about whether a small number of non-System/36 and 38 buyers could have inflated that number, IBM Director of Investor Relations Frank Hilben replied that the 30% figure was "well-distributed by geography and customers."

Schwartz declined to give specific shipment numbers to investors but said, "We have a very

aggressive plan for the AS/400, and we are on that plan."

Estimates of AS/400 shipments released earlier this year by many analysts were in the 25,000 range for 1988. IBM will boast that by a small amount as it continues to ship systems this month. Unlike other market research firms, International Data Corp. in Framingham, Mass., had estimated that IBM would ship only 12,000 AS/400s by year's end.

An IBM spokesman said the total includes the 1,000-plus machines that went out before general availability to IBM sites and to early support customers and developers.



IBM's Schwartz

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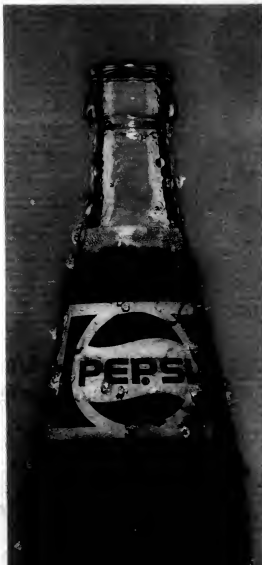
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NEWS SHORTS

Bolger seeks incentives

Bell Atlantic Corp. Chairman Thomas R. Bolger has urged the administration of President-elect George Bush to offer incentives to encourage private communications companies to build a switched, broadband network, which is necessary for information services to become universally available. Private companies will not undertake the massive investment without an infusion of billions in capital, and that may take guarantees that the investment will pay for itself, Bolger warned. "The extraordinary quality of voice services... makes the reality that the U.S. is falling behind in creating an information infrastructure for the information age," he said.

NEC to become a PCM

Japan's NEC Corp. is close to wrapping up technology transfer talks with Honeywell Bull, Inc. to manufacture IBM 3090-equivalent mainframes in the U.S., according to reports from Tokyo. NEC's technology would enable Honeywell Bull to produce NEC's ACOS 1000 mainframe in this country. Such a move toward a U.S. production base would allow Honeywell Bull, which is controlled by France's Groupe Bull and 15% owned by NEC, to meet conditions necessary to sell to the U.S. Department of Defense as well as commercial customers.

Brookhurst ends Zenith chase

Stating that the end of its consent solicitation is in the best interest of Zenith's shareholders, former avid pursuer Brookhurst Partners Limited Partnership has crossed Zenith Electronics Corp. off its Christmas list. Zenith's officers, according to Brookhurst Partners' Herbert Abelow in a prepared statement, "have persuaded the company's shareholders that Zenith is pursuing programs that will maximize shareholder value." Zenith and Brookhurst have also agreed to call off all pending litigation relating to the erstwhile takeover.

Neftsker haunts Symbolics

Symbolics, Inc. had an unexpected guest at its annual meeting last week: depressed chairman and co-founder Russell Neftsker. Neftsker, who still owns 340,000 Symbolics shares, or about 1.25% of the Cambridge, Mass.-based firm, nominated himself as a director — a move that was seconded — but he was solidly defeated in the vote. In remarks at the meeting, Neftsker attacked Symbolics' management for terminating development of a reduced instruction set computing chip and certain other research projects. Neftsker was forced to resign in February. Symbolics, after major layoffs and other cost cuts, reported its first profit in two years for the quarter ended Oct. 2.

Nixdorf ahead of schedule

Retail giant Montgomery Ward Co. and Nixdorf Computer Corp. last week reported the completion of a \$50 million store automation project one year ahead of schedule. Under a contract awarded to Nixdorf in 1986, Montgomery Ward installed 12,900 Nixdorf point-of-sale registers and 620 Nixdorf Model 8862 minicomputers in 334 Montgomery Ward stores.

HP shares the wealth

Hewlett-Packard Co. reached a milestone this year when it signed more than \$10 billion in orders, and HP President John A. Young said the company will distribute \$72 million to 78,500 employees. The checks, when combined with a second profit-sharing distribution in the spring, amount to two to four weeks of extra pay. Profit sharing in one form or another has been part of the company since it was founded 49 years ago.

Blin joins software council

The Transaction Processing Performance Council, based in Los Angeles, Calif., collected another member last week when Blin, the Illinois, Ill., developer of a hardware/software transaction processing system, became the group's 26th member. The council is attempting to develop a standard for Debit/Credit benchmarks of database management systems.

MAI presses Prime campaign

BY NELL MARGOLIS
CHICAGO

TUSTIN, Calif. — MAI Basic Four, Inc. last week accelerated its campaign for corporate credibility and escalated the hostility level of its ongoing bid to acquire Prime Computer, Inc.

Early in the week, MAI chairman and controversial New York financier Bennett S. LeBow took the podium at a conference room at the World Trade Center in Manhattan and urged his technological credentials on market analysts and reporters.

LeBow rebutted speculation that the proposed deal is an attempt to produce a financial windfall for his MAI shares, which were recently shopped around, or that he would carve up the resulting company and sell off large chunks to finance the acquisition. "It is not a financial transaction for financial purposes, LBO [leveraged buyout] or otherwise," he said. "The one thing we want to convey to you," LeBow said on behalf of himself and longtime partner William Weiskel, "is that [MAI and Prime] are a strategic fit and that we are computer people."

Between them, LeBow said, he and Weiskel have from 20 to

30 years' worth of experience in the industry. "We understand the computer business," he said.

Weiskel reiterated the intent to create a larger computer company. "There is no plan to buy or sell off any assets of Prime," he claimed.

Earlier attempts to sell MAI notwithstanding — including an attempt to interest Prime in buying it — Weiskel said, "MAI is not for sale — period."

Raising consciousness

Stephen Dube, an analyst at Shearson Lehman Hutton, Inc., said that the presentation successfully raised his consciousness of MAI as a contender. "After the briefing," Dube said, "I will see their justification for going after Prime as weak, but I see their resolve as strong."

In addition, LeBow said that MAI would consider sweetening its current \$20-per-share offering price if Prime would sit down for the bargaining table — provided that the friendly posture was accompanied by financial information showing that an increase was warranted.

The prospect of friendly negotiations between MAI and Prime ended in December at mid-week, however, with a volley of actions fired off by MAI. The

would-be buyer extended its cash tender offer through Dec. 21 to give the Delaware Chancery Court time to rule on MAI's attempt to dissolve Prime's "poison pill" provisions. Earlier in the week, Weiskel stated that while failure to dislodge the poison pill would be a deal-breaker



MAI's LeBow

for MAI, "we mean ultimate failure." If the Delaware ruling is adverse to MAI, "we would appeal and look at other actions, such as a proxy fight," he said.

MAI also filed an amended complaint in the U.S. District Court for Massachusetts, leveling charges of securities fraud against Prime.

Duquesne links arms with Morino in merger

BY NELL MARGOLIS
CHICAGO

PITTSBURGH — Duquesne Systems, Inc. and Morino Automation, Inc. — two of the largest independent mainframe-oriented systems software players in a market in which Computer Associates International, Inc. reigns supreme — are about to join forces to form a \$400 million, 600-employee contender.

Following an announcement Friday by the two companies, industry reaction hailed the proposed merger as one of the most compatible and genuinely strategic alliances since Loral Skyway linked with H&S.

"Clearly, this is a move to offset the strength of... Computer Associates," said David Burke, chief executive officer of Loral, Ill.-based Panosystems Systems, Inc., also a competitor in the systems software market. "It gives us one that we have an industry that is mature enough to deal with threats from corporate predators and to address the needs of users for ongoing support and viability at the same time."

Users agreed. "I think that

this is nothing but great news for us and for the industry," said David Burke, vice-president of Pittsburgh National Bank's data center in Pittsburgh.

Calling the combination "a merger of equals," Burke,

all additions and no subtractions, according to executives of both merging firms.

"There will be no redundancy — only one of our [respective] products, the billing package, overlaps — so there will be no layoffs," Duquesne Chief Financial Officer Arthur F. Knapp Jr. said. "We're going to be hiring, not firing." Products will not be dropped, he said; plants will not be closed. Morino CEO Mario Morino will serve as chairman of

IF THESE guys can't make it happen, then the data processing industry is in sad shape."

DAVID BURKE
PITTSBURGH NATIONAL BANK

whose department uses software from both Duquesne and Morino, cited the companies as complementary when it comes to product lines, but identical in preaching and practicing strong user orientation.

"I can't see anything going wrong with supply or service," said Burke, who acknowledged that such was not always the case. "A lot of us are suffering from deterioration in services as a result of mergers — not of equals."

The new and as-yet-unannounced company will present a profile of

the new firm; Duquesne CEO Glen Chaffield will become CEO.

Growth by friendly acquisition, often of entrepreneurial companies, is high on the new firm's agenda, Morino said.

"We're seeing a very strong message to the market," he said. "Here's an alternative to CA, a growth avenue you can explore without tearing up your company."

Commented Pittsburgh National Bank's Burke: "If these guys can't make it happen, then the data processing industry is in sad shape."

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Prepping for another DB2

Though pegged to ship in late '89, users already plan for its arrival

BY JEAN S. BOZMAN
CHICAGO

CHICAGO — IBM, which announced Version 2.2 of its DB2 relational database management system in October, does not plan to ship the product until the third quarter of 1989. But users and consultants alike are already taking a look at a laundry list of changes they will need to bring Version 2.2 on-line.

DB2 Version 2.2 will give large users the ability to distribute DB2 databases

throughout their organizations. The various DB2 systems will be able to communicate in real time, giving users a sense of a single DB2 system. Users will not, however, be able to update remote DB2 systems; that feature is planned for future releases.

John Deere & Co. in Moline, Ill., one of the first DB2 users, said it plans to install Version 2.2 as soon as it becomes available.

"Right now, in order to access data in another system, you have to run a job to

extract the data and move it to your machine," said Chuck Malvest, manager of systems planning and data administration at Deere. "With 2.2, you'll be able to read the remote data on-line. That would benefit us, since we have several DB2 systems running" at different sites.

Before users such as Deere can put Version 2.2 on-line, they will have to learn a new lexicon of DB2 terminology. Each DB2 site will own its own data through a unique set of naming conventions. A new data dictionary for the entire network, called a communications database, will keep track of all users and their authorization codes, or Authids.

Martin Hubel at DB View, Inc., who spoke before 200 users at the Midwest DB2 Users Group here last week, listed

some new phrases ushered in by Version 2.2. Among them are Alias, which is a public name for a table or view; Lease, which is an eight-character VTAM label for the destination of a given data request; and Newauthid, which is a site-specific version of a user's authorization code.

Transparent translator

The communications database will have software translators that automatically change the destination table Newauthid, Hubel said. "Naming conventions will control who can look at the communications database," he explained, "while the communications database controls all access to the various DB2 systems in an organization."

End users, however, will be unaware of the data requests shooting across the corporate network. If an end user's request for data is not satisfied by his local DB2 database, the request will be sent to remote DB2 systems on other host computers.

But Version 2.2 is not expected to support remote data requests from other kinds of databases such as IBM's IMS, Hubel said. "You won't be able to do writes to remote sites for CICS and IMS. You can only do that locally."

Whatever convenience distributed DB2 databases may bring, the change may further complicate DB2 security and administration problems. Basically, many DB2 security concerns were only resolved in the last release, Version 2.1. "Imagine the fun that users can have with two or more security administrators," Hubel said. "Management issues will begin to come to the surface. Doing cold starts after one misstatement here and there, for example, could be tricky in terms of synchronization."

Remote updates of multiple DB2 systems are probably still several DB2 releases away, consultants said. "There won't be a two-phase commit protocol in Version 2.2," said Dale Kutnick, an independent consultant in Redding, Conn. "DB2 Version 2.2 will allow distributed viewing and sharing but not distributed updating."

Handshake of integrity

Two-phase commit implies handshaking between databases both before and after a transaction — something IMS has done reliably for years. The handshake is a final check to make sure both systems are running before an update occurs, which helps guarantee the data integrity of both systems after the update.

For security reasons, IBM will have to find a way to make naming conventions act as an airtight protection against hackers and unwanted invasions of remote systems. "There are still four or five things IBM has to work out about distributed DB2 database security," Kutnick said. "There's a need to coordinate and to synchronize multiple databases across an organization."

Consultants do not expect that IBM will work out all the kinks in its distributed DB2 plan until 1990 or 1991. "IBM's probably prototyped the remote update capability for multiple nodes, but they probably haven't resolved all the concerns people have about security and synchronization," said Michael Horvath, vice-president of Knaus Consulting, Inc. in New York.

"But IBM remains first and foremost a marketing organization. They've decided to introduce new DB2 features as they become available," he added.

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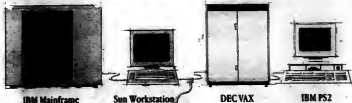
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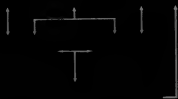
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Navy accused of favoring IBM

BY MITCH BETTS
OF STAFF

WASHINGTON, D.C. — Six vendors of IBM-compatible data processing systems have taken the unusual step of writing to Defense Secretary Frank Carlucci to complain that the U.S. Navy is steering contracts to IBM.

Late last week, a federal contract appeals board overturned a Navy contract award to IBM that was challenged by Pacific Capital, Inc., a systems integrator in Reston, Va., and one of the vendors that waged the protest.

The Nov. 17 letter, signed by execu-

tives from such firms as Amshel Corp., Storage Technology Corp. and Vion Corp., said that from 1983 through 1988, the Navy has repeatedly wired its contracts for IBM 370-compatible hardware to ensure that IBM products are used. This conflicts with federal regulations requiring full and open competition.

Lt. Jim Wood, a Navy spokesman, said the matter has been referred to the Pentagon's Office of the Inspector General. He declined further comment while the investigation is pending.

The Navy's alleged bias toward IBM has its roots in the "security blanket effect" that results from buying from IBM,

as well as peer pressure among Navy DP personnel, according to one of the letter's signers, Sidney M. Wilson, vice-president of Pacific Capital.

'Mailbox full now open'

The Pacific Capital challenge involved bids for about \$150 million in data processing work, which the appeals board ruled featured less than full and open competition in the Navy's bidding process.

Contract protests in the highly competitive federal market are usually handled by the General Services Administration's Board of Contract Appeals on a case-by-case basis. But Wilson said the group took its concerns to the top because the alleged abuses represent a continuing pattern of discrimination.

"The Navy ADP Selection Office has resigned itself to taking the easy approach and giving in to biased technical users," the letter stated.

The letter alleged that Navy technical personnel routinely write specifications to favor IBM equipment and manipulate the procurement process to ensure that IBM was the contract.

The letter said the abuses were evident in at least five specific Navy contracts that date back to 1983 and have a combined worth of more than \$1 billion.

The latest controversy, the complaint said, concerns "alarming evidence" that the Naval Data Automation Command intends to take extraordinary measures to give IBM a 10-year, \$150 million contract.

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Oracle to offer portable E-mail

BY STANLEY GIBSON
OF STAFF

Oracle Corp. will formally launch its office automation efforts tomorrow by unveiling Oracle Mail, an electronic mail product with links to its Oracle relational database management system.

Oracle claimed that the product is the first portable distributed E-mail offering. However, in its initial release, Oracle Mail runs only with Digital Equipment Corp.'s VAX/VMS operating system and Sun Microsystems, Inc.'s version of AT&T's Unix operating system. Oracle promised that the product would support other platforms in the future.

Ronald Wahl, vice-president of office automation products at Oracle, explained that Oracle Mail data, including messages, user lists and configuration information, is stored in the Oracle database.

He said an application written for Oracle Mail can draw on this information, offering more functions than E-mail packages not tied to a database.

"When hooked into a database, messages can automatically be sent to people who need to know the information," Wahl said, offering one application example.

Slow acceptance ahead

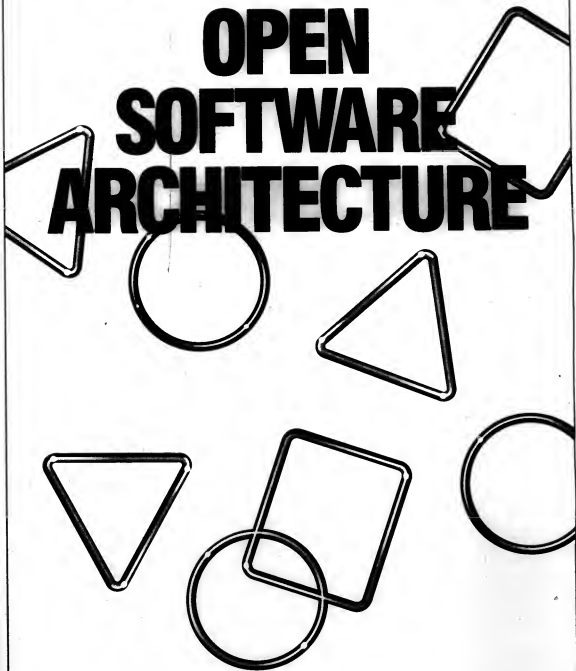
John McCarthy, an analyst at Forrester Research, Inc., said that many accounts already use E-mail products offered by established vendors. "Spilling into big DEC, IBM and DG accounts will be hard. This product is going to be a slow-burn product."

"It would be good to have a consistent Oracle user interface," said Dale Lowery, senior systems analyst at the National Council on the Aging, Inc. in Washington, D.C., and president of the Mid-Atlantic Oracle Users Group.

A Data General Corp. user with a Novell, Inc. LAN, Lowery said he would have to justify spending money on Oracle Mail because it would duplicate some of the capabilities offered with Novell's Network.

Ultimately, Wahl promised, Oracle Mail will be able to provide transparent communications on many different vendors' systems. "Users on any machine can address users on any other machine," he said. Other features he offered later are full text retrieval and user interfaces based on Apple Computer, Inc.'s Macintosh and IBM's Presentation Manager.

OPEN SOFTWARE ARCHITECTURE



IBM attends inaugural OTF meeting

BY JULIE PITTA
CHIEF

BURLINGAME, Calif. — The Open Token Foundation (OTF), an industry consortium of token-ring suppliers led by 3Com Corp., staged its coming-out party last week, bolstered by the attendance of IBM.

The OTF's stated purpose is to promote interoperability among token-ring products.

At its first formal meeting, the group elected the following officers: Robert Madge, president of Madge Networks

Ltd. in London, was elected chairman; Bill Swift, token-ring product manager for 3Com, became treasurer; and Richard Bennett, director of local-area network marketing at Memorex Telet Corp., was selected for the post of secretary.

3Com founder Robert Metcalfe, chairman of the Corporation for Open Systems, presided at the inaugural meeting. Other companies represented at the Tuesday meeting included Apollo Computer, Inc., Intel Corp., Wang Laboratories, Inc. and Texas Instruments, Inc. A total of 40 representatives from 23 companies attended the gathering.

Metcalfe said he was heartened by IBM's participation. "The fact that anyone from IBM showed up at all means a great deal, since we gave them practically no notice," he noted. "We're encouraging their participation as much as possible."

Not 'IBM bashers'

"It's important that we don't get positioned as IBM bashers," Metcalfe said. According to 3Com and Madge, IBM holds about 90% of the token-ring market.

At one point during the session, IBM's representative walked out of the meeting

room, Metcalfe said. "One of our speakers made the mistake of getting into a discussion of market share and business practices. The IBM representative was uncomfortable with the nature of the discussion," he explained. After a break, he returned to the meeting, Metcalfe said.

One of the issues the consortium hopes to address is the lack of suppliers of token-ring chips. So far, TI is the only supplier of both a 4M bit/sec. and a recently announced 16M bit/sec. token-ring chip set. IBM entered into a joint-development agreement with TI for the first chip set of this kind.

"It's very important to encourage alternative suppliers if this market is going to grow," he noted. "My secret theory as to why that hasn't happened is that token-ring is a very difficult technology to implement."

Patent controversy

Another issue that OTF faces is the claims of Otis Soderblom of Willemijn Holding BV in the Netherlands, who maintains that he is the inventor of token-ring and holds the patents to prove it.

Soderblom has been issued 36 patents worldwide for token-ring technology. While most vendors challenged by Soderblom have signed licensing agreements, Apollo and Madge have refused to acquire licenses. He, in turn, has filed lawsuits against Apollo and Madge.

Soderblom's claims have hindered growth in the token-ring market, Metcalfe said.

DEC, Cullinet in marketing pact

BOSTON — Cullinet Software, Inc. sought last week to sharpen its profile as a developer of Digital Equipment Corp. VAX-based software by revealing three Cooperative Marketing Program (CMP) agreements with DEC.

Under the agreements, DEC and Cullinet will jointly market Enterprise:Builder, Enterprise:Generator and Enterprise:Expert. Enterprise:Builder and Enterprise:Generator were formerly called Knowledgebuild.

In addition, DEC tapped Enterprise:Expert as the development tool kit of choice for Devco, a speech-synthesis and voice-recognition hardware option announced by DEC in October.

The DEC-Cullinet agreement is similar to one announced in October between DEC and Relational Technology, Inc. However, company officials explained that under that pact, called a Digital Distributed Software agreement, Relational Technology's Ingres database tools are used directly by DEC's sales force. Under the Cullinet agreement, as with all CMP plans, DEC personnel would recommend rather than sell Cullinet software.

At the announcement, Cullinet Executive Vice-President John Landry demonstrated an application he currently uses to track product development. Managers can report to him by voice using the system and can update a database using voice commands.

At Cullinet's annual User Week held in St. Louis in October, the company announced that Enterprise:Generator and Enterprise:Builder will support DEC's RDB relational database.

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EDITORIAL

The dark side

IT'S HARD TO say which revelation about the virus that attacked the Internet system six weeks ago is more troubling — the news that the program was badly written or the likelihood that it was planted intentionally.

After the virus brought an estimated 6,000 computer systems throughout the country to their knees on Nov. 3, academics and technicians were quick to praise the vicious little program for its elegance and its alleged creator, Robert T. Morris, for his "brilliance." A simple oversight sent the program out of control, worming its way through the nation's Unix systems, they said, a misplaced zero. Could happen to anyone.

Now we're not so sure. Scientists who have been reverse-compiling the Internet virus report that the intruder was much smaller and sloopier than originally thought. It contains dead code and circular references and bears evidence of having been lifted in part from other programs. It is also a fraction of the length and complexity that admiring experts had imagined.

Some experts now think that the worm was rushed onto the system to begin doing its dirty work before Internet users could install a vaccine that had been posted only a few days earlier. Prior reports had maintained that the program's author had released the virus by accident.

This news is troubling on two levels. For one, it is unnerving to think that a network disruption of this magnitude could be caused by a badly designed program. We would much rather chalk up the Internet virus to the work of a brilliant hacker and take comfort in the knowledge that it is not likely to happen again. In fact, indications now point to the opposite. The Unix community was buzzing last week over a bulletin board message that showed how users can run a six-line program that gives them complete control of the password files on some versions of Unix. Who knows what other bugs exist in that and other operating systems?

It is also disquieting to think that the program's creator(s) may have rushed it into action to make its disruption that much more severe. Until now, we have preferred to imagine hackers as clever but benign people, bumbling along in the heat of their passion for technology with amiable disregard for the impact of their actions.

But evidence is already mounting that hackerism has its dark side. Several copycat break-ins have been reported in recent weeks, including one early this month that forced the Department of Defense to cut the link between its Milnet system and Internet (CW, Dec. 5). The Defense Advanced Research Projects Agency responded last week by creating a sort of security SWAT team to respond to Internet emergencies.

Clearly, computer site managers are dealing with a more potent force than has been believed. Not only are systems proving to be more vulnerable than many had thought, but the motives of the intruders may be more sinister. The Internet incident and its fallout will ultimately teach a useful lesson, even if it is only that we have been too smug. It can happen to you.



News Item: AT&T plans to write down most of its analog telephone equipment

LETTERS TO THE EDITOR

Overdone

Concerning "Virus ravages thousands of systems" (CW, Nov. 7), it is bad enough to proclaim that thousands of systems were ravaged, a verb that means to visit destructively and violently, but the assertion that between 6,000 and 250,000 were so ravaged is laughable. One compares viruses of mowing, wounded computer systems littering the land, leading cooling fluids on the scorched tiles of their elevated floorboards. Come, guys — between 6K and 250K is quite a delta.

The histrionics of the headline are bad enough in a periodical that purports to be serious, but there is a real danger in this kind of sensational nonsense. It is this: Numerous executives under whose dominion the computer department falls will pay to night terrors and cold sweats at the idea that this thing that they don't understand will invade and ravage their computers. This will result in more bureaucratic barriers to productivity cloaked in the guise of computer security, making the jobs of those of us who have to do the work even harder.

Michael Sarnberg
Gloucester Point, Va.

Too easygoing

Your article about the computer viruses (CW, Nov. 7) unfortunately reflects the lack of control over most data processing installations in the U.S. as well as the world.

As someone who has 31 years of experience in data processing and who is a certified information systems auditor, I say that anyone who gets zapped with a computer virus deserves it. With

only a few changes in operational and developmental procedures, any organization can prevent computer viruses, bombs or whatever other fad becomes popular.

Viruses occur because people allow their data processing to be controlled by uncalibrated weapons and wild technicians. People who give such a high degree of recognition to user friendliness over controls and compliance are the ones who perpetuate viruses, not the ones who plant them.

Leaving the solution of problems and elimination of viruses to philosophical theoreticians will do nothing except create a false sense of security. To paraphrase George Bernard Shaw: "It is too bad that God left data processing to the data processors."

Richard A. Katsman
President and Principal
Richard A. Katsman
Associates, Inc.
New Cumberland, Pa.

A good reason

In response to a letter titled "Who needs race?" (CW, Nov. 7), it seems to me that many people have a problem recognizing the purpose of organizations catering to the black community or any other ethnic, cultural or minority group.

These organizations are not formed to increase or promote segregation. Rather, their purpose is to realize that black people in data processing or any other industry do not have the same amount of networking opportunities and information as their white counterparts and to exist as support groups for these communities.

I am sure that Black Data Pro-

cessing Associates does not require membership based on race, color or creed, but rather on interest and concern for an exclusive minority group. Racism cannot be reduced by ignoring race; race is a reality.

Elizabeth Wharton
Information Systems
Technician
Washington, D.C.

Mind power

Regarding your article "Software design: It's all in your mind" by Robert Glass (CW, Nov. 7), I feel that this process is exactly why highly advanced artificial intelligence systems will be difficult, if not impossible, to create.

The human approach to problem analysis requires converting the problem into an alternate reality and back again. Computers will find it difficult to relate to anything but binary structures. Human consciousness is not structured like the physical universe it deals with. Solutions come from this alternate reality. Where will computers go for their "alternate reality"?

The article was spot-on. It finally acknowledges the fact that creativity and imagination are fundamental aspects of our industry, not just abstractions to be tolerated.

David Darling IV
Data Processing Manager
Rally Associates, Inc.
Miami

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Labovitz, Editor, Computerworld, P.O. Box 9171, 375 Connecticut Road, Framingham, Mass. 01701.

Heroes are breaking MIS mold

HERBERT HALBRECHT



Consider a profile of the information systems executive: a manager highly concerned with growth and numbers — particularly increasing the size of his budget and staff.

This person strives to create a data center capacity that can handle 100% of a company's maximum anticipated needs. To do so, the latest technology is desired, so long as it interfaces with systems the IS executive is comfortable with and understands.

To ensure quality and consistency for end users beyond the data center's control, the executive hires a team of in-house software programmers to develop and redevelop authorized programs.

This stereotype certainly is common. But in today's business climate, it could turn out to be the worst image for an IS executive.

Halbrecht is president of Halbrecht Associates, Inc., a Stamford, Conn., executive search firm specializing in high-technology areas for American and international companies.

tive to convey.

At a time when most corporations are reexamining operations and expenses, information systems naturally comes under closer scrutiny. Yet many IS executives still seem preoccupied with empire building. Opposed to efforts to cut back, they claim that any infringement on their turf could be technologically detrimental to the organization.

There are executives, however, who have shed the stereotype and become heroes within their companies. They set out to understand the business' basic purpose and financial needs. And they commit themselves to the bottom line by streamlining information systems operations.

The difference between heroes and also-rans is that the former see the MIS executive not as a technician but as an investment banker. Thus, capital expended on information systems is an investment in the entire organization, not one department. Here are some benefits of becoming the MIS hero:

- **Reduce in the ranks of MIS** redundant staff. No company really needs an information services capability to handle 100% of anticipated maximum need. The savvy IS executive maintains staff and technology to

manage the average daily work load. Extra work volume, which may vary depending on projects and needs, can be farmed out more efficiently to any number of firms specializing in a particular area.

In many cases, the outside firm can perform the needed tasks at a cost per unit substantially less than what can be done in-house. For example, instead of making a permanent capital investment in data center capacity, consider contracting out work to a facilities management company.

The same can be said of internal software development. During the past five years, the growth of the software industry has resulted in better software packages at a lower cost than companies can themselves develop.

It will always be necessary for a company to maintain an in-house program design group, but it should be possible to cut back mediocre software development staffers and retain just a small number of highly qualified, high-paid developers.

- **Heroes in MIS become information facilitators.** Too often, MIS is an obstructive obstacle to accep-

tance of new technologies. Perhaps because of these traits, many hardware and software companies market their products directly to more adventurous end users. Computer-aided software engineering and front-end software packages are typical examples.

The IS executive ought to be the technology quarterback — the facilitator of the information process — especially by assisting other parts of the organization in identifying business information needs and selecting the best solutions to meet them.

It is critical that the IS execu-



NEA/SHIRALA

tive build and maintain credibility when dealing with functional area managers and users. This person can make a major contribution in selecting products, for instance, helping managers see through the gloss of a vendor's marketing pitch.

Heroes in MIS look to the outside world for solutions to problems. Consider offshore programming and systems development. A growing number of companies have taken to farming such work to other countries, just as in manufacturing. Travelers Insurance does systems design in Ireland. Unisys in India, AT&T in Singapore, Coopers & Lybrand in Argentina and American Airlines in the Bahamas and Santa Domingo. Other outsourcing operations in Hong Kong, Taiwan and even Israel.

Companies are finding that many basic information systems functions can be performed quite adequately halfway around the world and at significant savings.

These ways of thinking are found in IS managers being identified for advancement today. The bottom line is that only those people who identify with the organization's business goals as a whole will ever make it into the top IS ranks, much less into senior management. And only those who are genuinely committed will succeed there.

You can wait for OS/2 or jump into Windows

AMY WOHL



For some personal computer users, the holiday season seems more like Halloween than Christmas — the witching hour approaches.

It once again becomes clear that no matter how much power came to the desk top with PCs such as XT's and AT's, users want more. OS/2 and Presentation Manager have raised new, higher expectations for friendly interfaces and multitasking, as well as for more powerful platforms able to support next-generation applications software.

Users, especially in large companies, will probably move to the OS/2 platform, but this migratory wave is perhaps as far off as 1991 or '92.

So the promise of additional power offered by OS/2 and Presentation Manager hovers on the horizon with its not-yet-defined

elated application software.

A few hundred applications are beginning to be ported from DOS to OS/2, but most of them are tools and utilities or boring, workday packages that would scarcely inspire millions of users to double or triple their current PC investments.

Applications that use the more seductive Presentation Manager are still — except for IBM's own DisplayWrite 5/2 — largely in the future.

In the meantime, at least some users have been unwilling to stand still. There is a pent-up demand for multitasking and better interfaces. Into the penumbra of the marketplace comes a refreshing possibility: Windows!

Unlike early OS/2 software, which does not yet take advantage of the newly shipped Presentation Manager interface, applications software for Windows is mainly designed to use its Graphical User Interface.

In important application categories like spreadsheets and word processing, the initial Windows products are not just attractive, but their functionality often exceeds that available on conventional DOS platforms.

Developers have correctly guessed that customers are still unwilling to go out and buy the substantial upgrades and new machines needed to run OS/2 with Presentation Manager. We have a real "chicken or the egg" situation here — customers are waiting to see software before they buy hardware, and some developers are waiting for customers to invest in hardware before making big investments in software development.

Developers seem more confident that customers will make the small extensions to current environments required to get started with Windows.

The here and now

The delayed inevitability of OS/2 and Presentation Manager raises a few questions that users and their IS management must ponder: What is really available now? There is not a minimum set of OS/2 Presentation Manager software yet, and most users will want to see their favorites (1-2-3, Dbase, Word Perfect) plus at least one thrilling, new application before they're ready to make the change.

Users need to keep in touch with the latest information. Developers make commitments, but PC software developers are notoriously bad at estimating when software will actually be available.

Update information is impor-

tant, because it could change your hardware strategy or migration schedule. Graphical user interface environments are not trivial to develop for, particularly if your development team has little experience in this area. But these skills are transferable, and a team that has done a Macintosh or Windows product should be quicker at writing one for Presentation Manager.

If you have to choose something immediately, what should you choose and how? If you need multitasking for existing software applications, you'd do well to choose Quarterdeck's Desqview. It is the easiest and least expensive, and it is available now.

If you're looking to use multiple graphical user interface programs as soon as possible you'll choose Windows.

If you're looking to move to OS/2 environment as soon as possible, you'll start investing now in OS/2 Presentation Manager and OS/2-capable machines. Though there will not be much in the way of graphics user interface software, you will be minimizing the future pain of making multiple investments during the migration period.

Will you pick Windows now as a permanent replacement for OS/2 Presentation Manager or as just a temporary solution? And just how long is temporary? This question is crucial.

Many users will get into Windows thinking of it as a practice run for the real stuff — that is, Presentation Manager. For some it will be. But lots of organizations will find that successful investments build a big inertial mass — in software, in training and, more important, in familiarity.

Customers may choose to start with their initial, "temporary" choice for much longer than they had originally planned. In the long term, the real answer to Windows versus Presentation Manager is applications software. Whichever environment attracts the best, the most, the single critical piece of applications software will win. We won't know how this market battle will shake out for at least a year, maybe longer.

In the meantime, user organizations need to begin to test the new interfaces, to experiment with them (noting their value) and to make the tough decision of whether to pick one, pick many, pick all — or just to wait and see.

I suspect that while they're doing that, users will also look more closely at other graphical user interface environments, especially the Macintosh platform with its more mature software — more than 3,000 packages, all with graphical interfaces and high levels of cross-application integration.

Words reap more than products

IBM WATCH

MICHAEL KILLEN



IBM is perhaps the only vendor that can gain more by announcing its strategy than by actually delivering a product.

There is no clearer example of this odd ability than in IBM's presentation and promotion of Systems Application Architecture (SAA). Nearly two years after its introduction, SAA still represents more long-term promise than actual products.

Yet, IBM and MIS are already benefiting from the strategy.

SAA is IBM's plan to create standards across its numerous proprietary operating systems. In essence, it provides a framework for development that will allow applications to run consistently on IBM's major systems. The systems identified are those based on MVS/XA, OS/400, VM and OS/2 Extended Edition.

IBM has also promised about 20 software products, interfaces and data streams under SAA to facilitate consistency across the designated product families.

Each product fits within one of the

three SAA elements — Common Communications Support, Common Programming Interface and Common User Interface. At the time of the announcement in March 1987, IBM promised to produce all the SAA-designated products within two years.

Behind the products are larger promises IBM is making to MIS. SAA, according to IBM statements both public and private, will help solve three major problems: reduce the applications backlog, protect MIS investments in existing computer systems and reduce the cost of using IBM systems.

Slowly, IBM is producing the designated SAA products. True, the C language is not available on the Application System/400, and the Report Program Gener-

ator is not available on OS/2 Extended, MVS/ESA and VM/XA. However, many other products are now available, particularly software and communications interfaces.

IBM's promise to help MIS directors reduce their application backlog by improving programmer productivity requires common interfaces and programming tools.

MIS investments in existing systems can be substantially protected by providing product direction and a means to use parts of existing systems to build "enterprise" and "cooperative" processing systems of the future. IBM intends to lower the cost of using computers by providing a common user interface and a common approach to accessing data on disparate systems.

Promises to keep

During this period of partial products and loud promises, the only real applications backlog reduction from SAA is occurring purely by default. MIS is lowering the applications count by pointing out to management that certain projects on the backlog list require the use of non-SAA or nonstandard IBM software. Once that problem is understood, no one wants to support development for those applications.

The SAA announcement alone is also helping MIS managers protect their current systems investments. IBM is identifying which products will be supported under SAA and which will not. Therefore, MIS can invest in IBM products that are useful for the future and reject those that are not. Many managers are concentrating on building their companies' systems around products blessed by SAA coverage.

However, IBM is not directly delivering anything to fulfill its promise to protect MIS investments. Until MIS managers actually migrate a particular piece of software from one SAA product family to another or effectively use any of the existing investment to create either a more integrated computer system or a meaningful cooperative processing system, the investment is still in jeopardy.

With respect to the goal of reducing the cost of computing, IBM's Presentation Manager makes up most of the SAA Common User Interface. That software module became available — in a limited fashion — only at the end of October. Without the availability of the Presentation Manager and the widespread use of products that implement it throughout a company, MIS cannot attain the promised reductions in the cost of users learning and relearning how to work with workstations and applications. The failure to produce the Presentation Manager sooner hinders IBM's ability to deliver on this larger commitment.

Although some improvements are visible from IBM's SAA announcement, they are largely because the company is making its long-term strategy apparent, perhaps for the first time.

The real benefits of SAA products will not be attained unless MIS refuses to let IBM off the hook. Only by holding the company to its rhetoric will MIS finally see the SAA promises kept.

Killen is president of Killen & Associates, Inc. in Palo Alto, Calif. He wrote *IBM: The Making of the Common View*, a Harcourt Brace Jovanovich, Inc. book about the development of IBM's Systems Application Architecture.



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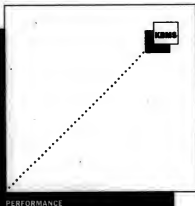
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—Software Magazine 1988 Software Market Survey



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SYSTEMS & SOFTWARE

SOFT TALK

John L. Berg

IBM stacks the deck



Theoretically, each U.S. organization that is a member has one vote in the American National Standards Institute (ANSI), the "standard interface" to the International Standards Organization (ISO), and each country has one vote in the ISO: a neat organization of blocks built on blocks.

In fact, both ANSI and the ISO are more like a deck of cards than a solid block. Each consists of many sub-units that manage and develop standards. For that deck and you find each sub-unit in the ANSI process has one vote for each company and, in the ISO, one vote for each country. A company can have as many sub-unit votes and as much influence on any standards as it can afford to buy.

Visualize a single standard moving up the approval ladder from an initial ANSI draft specification to an ISO standard. The draft must move through a network of approvals from technical, procedural and related technical committees. The draft's sole task becomes surviving all negative comments. If you wanted to delay a stan-

Continued on page 32

Hospital gets treated to paperless med records

ON SITE

BY AMY CORTESE
CW STAFF

ATLANTA — One year from now, wielding clipboards and pens will be a thing of the past for doctors and nurses at Grady Memorial Hospital here. Instead, they will be using terminals on-line, accessing paperless medical records.

A medical information system running on Digital Equipment Corp. VAXs under DEC's Ultrix, a version of AT&T's Unix, has

automated many of the hospital's operations and will encompass all departments by 1990. The system, nicknamed Theresa, allows physicians and other hospital staff to enter patient information directly into terminals, eliminating the need for paper records. Once entered, this information makes up a historical database that may be searched by physicians to aid in diagnosing patients' illnesses, as well as by administrators to help manage hospital resources.

Consisting of 6½ million records, Theresa is the largest clinical

aid system in the world, claimed Henry N. Camp, president of Medical Systems Development Corp. (MSDC) in Atlanta, which is the developer of Theresa.

Grady is a teaching hospital associated with the Emory School of Medicine at Emory University and is one of the largest hospitals in the U.S., treating 3,000 outpatients a day at its numerous clinics and maintaining a 90% occupancy rate of its 1,000 beds. The result is approximately 18,000 movements of medical



Camp with Theresa, his favorite clinical aid

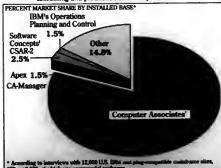
records a day through the hospital's various departments. "There's no way paper can keep up with patients," claimed H. Kenneth Walker, vice-chief of medicine at Grady.

Continued on page 30

Data View

Feasting on market share

Computer Associates tops up more than 80% of the data center scheduling and production-control software market



* According to interview with 12,000 U.S. 800 and prog-compatible subsidiaries sites, 37% or 2,000, at which we conducted program

SOURCE: FOCUS RESEARCH SYSTEMS, INC.
52-12665

DEC is giving it away

Three-pronged educational program targets colleges

BY JAMES DALY
CW STAFF

MAYNARD, Mass. — Firm in its belief that today's computer science majors are tomorrow's computer systems purchasers, Digital Equipment Corp. has targeted future users with a three-pronged program designed to get its machines into schools.

DEC's move to woo the university crowd jibes with similar moves by vendors such as Sun Microsystems, Inc.

The first portion of DEC's Education Initiative is called The Campuswide Software License Grant Program [CW Dec. 5].

The program allows schools to use the VMS and Ultrix oper-

ating systems and more than 160 software products at no charge. To qualify for the Ultrix license, schools must have their VAX processors enlisted under the AT&T site license agreement for Unix, according to the firm.

The plan's second part — The Education Software Library

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Inside

- M&D execs on SAA, the OSF. Page 27.
- DEC mid-range file server out. Page 27.
- Take your Pick of Fujitsu business systems. Page 33.

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DEC adds servers to mid-range

BY JAMES DALY
OF STAFF

MAYNARD, Mass.— Hoping to boost its standing in midrange desktop accounts, Digital Equipment Corp. recently announced the VAX Fileserver 6200 series.

Although the products simply combine off-the-shelf hardware and software and give them a new name, analysts praised the move because it enables DEC to transplant its 6200 series into non-DEC workstation environments as file servers.

"DEC realizes that even if the desktop is already owned by Sun or Apollo or somebody else, they can at least control the network. And, generally speaking, the vendor who controls the network controls the account," said Terry Shannon, an analyst at Framingham, Mass.-based market research firm International Data Corp.

The server, which comes in one- or two-CPU versions, can operate as a stand-alone system or be added to a Vaxcluster to handle the I/O burden of a workstation network. DEC said it will target the servers at large engineering and university accounts.

The single-CPU 6100 version running under the VMS operating system is priced at \$269,800, while the dual-CPU 6200 will sell for \$379,900, the firm said.

The two versions running under the Ultrix system are the single-CPU 6210, which will sell for \$233,000, and the dual-CPU 6220, which is set to sell for \$329,500.

The next few steps for M&D

IN PERSON

Frank Dodge is president and chief executive officer of McCormack & Dodge Corp., a division of Dun & Bradstreet Corp., and W. W. D. Dowdell is director of research and development at M&D.

Dodge cofounded the firm in 1969 and has led the company since. Dowdell came to M&D from Computer Associates International, Inc. He had previously been manager of development systems at Software International Corp. for five years; he was architect of that firm's Masterpiece software series. His R&D work at McCormack & Dodge puts him in charge of new technology, artificial intelligence, distributed systems and development for IBM's Systems Application Architecture (SAA).

Dodge and Dowdell were interviewed recently by *Computerworld* Senior Editor Stanley Gibson.

What is the significance of IBM's SAA to McCormack & Dodge and its users?

Dodge: When it is available, SAA presents a promise that developers of software will be able to provide products quicker to the user. We'll still have Millennium, however.

Dowdell: The vast majority of our research and development people are working on SAA. SAA is one of the enablers for the next generation of software, and without question, SAA will make our lives far easier.

The two most important things about SAA are the CPl for communications and an SQL-based relational database. These things will make it possible to distribute an application over multiple machines.

Dodge: SAA is slipping out in pieces over a long period of time. When will SAA be available? In five years? So we will evolve Millennium toward SAA.

With regard to Millennium, we will probably change the soft-

ware significantly over the next five years.

Cooperative processing and systems integration are two major trends in software. What is your strategy, beyond SAA, to address them?

Dodge: I'd like to stress the importance of Millennium to us. Millennium is the platform, Millennium is the real integrator.



Millennium on VAXs provides distributed or cooperative processing already. And Millennium allows you to have the same software in different environments, either with IBM or the VAX.

Are you keeping an eye on developments relating to AIAT's Unix and the Open Software Foundation?

Dowdell: Either Unix or OS/2 will be the major IBM-compatible environment in the future. I'm making sure M&D can handle it.

Continued on page 31



McCormack & Dodge's Dodge (left) and Dowdell

SOFT NOTES

NLI establishes English capability for Oracle

Oracle Corp. and Natural Language, Inc. (NLI) announced a co-marketing agreement that will bring NLI's English-language front end to users of the Oracle database. The Natural Language database interface allows users to perform queries using English commands without any knowledge of SQL. NLI, headquartered in Berkeley, Calif., will sell and support the interface. Prices range from \$6,000 to \$150,000, depending

on the configuration.

Callinet Software, Inc. is Westwood, Mass., signed a major contract to supply its Callinet Banking System and IDMS/II database management system to Malaysian Banking Berhad, the largest banking group in Malaysia. The contract marks Callinet's second recent contract with an Asian-Pacific firm for the Callinet Banking System.

Continued on page 31

HARD BITS

Formtek, DEC ink OEM pact

Formtek, a privately held supplier of software products for technical information management, has signed an OEM agreement with Digital Equipment Corp. under which Formtek will market systems based on DEC's family of Vaxstation and Microvax products. The system will provide for the electronic capture, creation, modification, storage and distribution of engineering drawings and related documents.

Irvine, Calif.-based Computer Connection, Inc. has announced the availability of its entry-level

Powerserve/386/1000 systems bundled with its Basic-K language compiler and up to 380MB bytes of disk storage. The Basic-K language compiler is compatible with Wang Laboratories, Inc.'s Basic-2, which is used in the development of applications for the Wang 22000, the firm said. Suggested list price for the system is \$23,850.

Jupiter Technology, Inc. has announced support for IBM's System/36, 38 and Application System/400 series of mid-range computing systems. The Val-

Continued on page 32

Syloggy announces an online sort that will bring down the house instead of the system.

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*There will be a minimal charge of \$50 for either an X.25 or V.42 upgrade on products purchased before October 1, 1988. Products purchased on or after October 1, 1988 will include either standard as they become available.

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Hospital

CONTINUED FROM PAGE 23

Radiology, pharmacy, medical records, nursing and pediatric operations have been automated to date, and Grady plans to expand the system to encompass all of the hospital's 60 clinical areas by the end of 1989.

The system is currently growing by 2% million records per year, and Camp expects that growth to increase to nine million records per year as the remaining areas come on-line.

Grady switched from the University of California at Berkeley's 4.2 version of Unix to Ultrix last year, and the hospital is receiving vendor support for the first time since going with Unix.

Origins of a system

The system has its roots in a research project that began in 1976 by the Georgia Institute of Technology and the Emory School of Medicine. The hospital knew it needed a fast, multiuser system that could handle massive text manipulation, said Camp, who was then conducting research at the Georgia Institute of Technology. The developers decided on Unix, which at that time was a relatively unknown and unsupported operating system from Bell Laboratories.

Unix is often criticized for not being as secure as other environments. But Camp said he finds Unix, when properly handled, as reliable and secure as any other operating system. MSDC has added security and integrity enhancements, such as record-level locking, to Ultrix. DEC has agreed to support modifications to Ultrix by MSDC, Camp said.

To further boost integrity of data, users—including doctors and computer systems—never have to type a Unix command. Instead, all interaction with the system is done in English, through an English language shell. That way, errors can be avoided, Camp said.

When initial research was completed in 1979 and funding ran out, the MSDC was formed to go ahead with the project at Grady and develop a system that could be sold commercially.

The system is run on a VAX "matrix," Camp said, borrowing a Grace Hopper term. The matrix consists of five VAX R560s connected by Ethernet. DEC does

not support VAX clusters in an Ultrix environment, so Grady went ahead and built its own equivalent. Unlike a DEC VMS cluster, the matrix cannot share physical disk storage, but any computer can access information transparently from any other in the matrix. Grady will migrate to a VAX cluster when DEC supports that under Ultrix, Camp said.

In addition, the hospital is planning to move to graphics-capable terminals from the ASCII terminals it is using today. The newer technology will allow doctors to use windowing to display more than one record at a time on the screen and pointer technology such as a mouse or other devices to enter and retrieve information.

Graphics software will enable doctors to pull up diagrams of body organs and,

with the click of a mouse or touch of a light pen, indicate a lesion in the lower left lung, for instance, and store that image.

During the next year, Grady will transfer its data to write-once read-many optical storage, and by 1990 Camp said the hospital will fill 5G bytes of optical disks per year.

The medical information system does not include rule-based expert systems technology. Instead, Theresa is a decision-aiding system. Its knowledge is derived from the actual records of an organization. Where rule-based systems are very structured, Theresa allows flexibility in how the knowledge contained in the database is searched and used. The system's cost to Grady is proprietary, but MSDC will sell the customizable system

to other hospitals for several hundreds of thousands of dollars for a module to up to \$4 million for a total system.

For Grady, the system has already resulted in significant savings and efficiencies. For instance, the wait time for the pharmacy to fill a prescription has been reduced to 27 minutes from 90 minutes before the department was automated.

In addition, charge capture has improved dramatically, so that the outpatient pharmacy increased reimbursements by \$1.3 million last year, and radiology increased billings by \$2.5 million.

These economies aside, Camp said the system is easily cost-justified on ease of use alone. A doctor's time is costly, and the system saves time for doctors.

How
smart planners
have turned
the Bell break-up
into a significant
strategic
advantage:

Giving it away

CONTINUED FROM PAGE 23

Program — is a software maintenance and support program under which an institution establishes a central site that not only acts as a technical support center but manages the purchase, distribution and support of DEC's software.

DEC, in turn, supplies software, documentation and updates to the central site and provides added support through a direct telephone link to a DEC software specialist.

DEC downplayed the notion that granting users the right to copy a piece of software campuswide will create a problem with pirating software and tracking software licenses.

Under the final part of the new initiative, the Campus Service Agreement, DEC will offer a 75% discount on service to educational institutions that perform their own maintenance.

M&D

CONTINUED FROM PAGE 27

die both. Right now, OS/2 is the most complete SAA implementation.

A key will be in managing X Windows, the Macintosh user interface and Presentation Manager so that the business logic of the application remains the same.

What about other interfaces, such as New Wave and Open Look?

Dowdell: We are not developing for either of those.

Are you actively pursuing Macintosh development?

Dowdell: It may be inevitable to develop

for the Macintosh, but we are demand-driven, so we will wait until demand is there.

Some have noted that accounting applications have stabilized. How do you view that market?

Dowdell: There is no reason to improve an application unless people demand improvement. That generation of applications has been perfected. SAA can lead to the next generation.

What we're going to is an object-oriented application approach. This will allow us to create objects that are views into an SQL database.

What should users demand from software?

Dowdell: A truly intuitive user interface would help.

What about Application System/400 development? You apparently chose the VAX as your mid-range platform. However, it appears that the AS/400 is destined for a large role in IBM's overall strategy. It was conceived as an integral part of SAA. Isn't it inevitable that you develop for it?

Dodge: Yes.

Dowdell: I should point out that we have more product today on the AS/400 than MSA does, and they have committed to developing for it.

Do you mean your programs for

the System/38 that run on the AS/400?

Dowdell: Yes.

Regarding IBM's Application Systems Division — it was at first viewed as a potential threat to the independent software vendors. It's been over a year since ASD was founded, and we're not hearing much noise about that anymore.

Dodge: Their organization is very confusing to most of us. Thus far we haven't seen products coming out of the ASD. However, that doesn't mean they're not being worked on.

ASD is also supposed to promote SAA, isn't it?

Dowdell: The real glue that holds SAA together is Earl Wheeler. SAA needs applications to fly. Right now, IBM recognizes there is more potential for SAA by supporting software vendors than in IBM writing its own applications.

Many software firms, once viewed as highfliers, are now having a hard time turning a profit. Is there a malaise in the software industry, and is M&D avoiding it?

Dodge: The reason Callinet and ADR have had such problems is that IBM entered their market, database management.

Their major revenue stream came from database management, and that was shut down overnight.

When your revenue stream dries up, then your expenses are suddenly out of line.

Although D&B does not break out your financial results, could you give some indication of how well M&D is doing?

Dodge: The mid-year results in June show revenues up 21% over a year earlier. And we did that without acquisitions.

Soft notes

CONTINUED FROM PAGE 27

UTS Ltd., a British firm that sells Digital Equipment Corp. VAX software internationally, has purchased the Pacs Plus division of Goleta, Calif.-based Signal Technology, Inc.

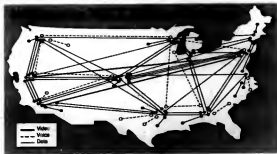
Pacs Plus is a widely installed resource and accounting software package for the VAX/VMS environment. Signal Technology sold the Pacs division to focus on its data management products, according to President John Markel. UTS will acquire the products and staff of the former Signal division.

Multiflow Computer, Inc. and the Westinghouse Engineering Service Bureau will cooperatively market Westinghouse's line of finite element analysis software and Multiflow's computers.

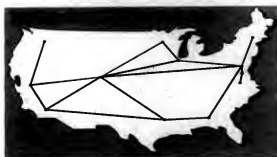
Multiflow, which is based in Bensford, Conn., converted the software, which once required supercomputer performance at a correspondingly high cost, to run on its high-performance computer systems based on very long-instruction word technology.

Under terms of the agreement, the software will be verified and maintained by the Westinghouse Service Bureau, a subdivision of the Westinghouse Nuclear and Advanced Technology Division.

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Berg

CONTINUED FROM PAGE 23

dard's acceptance, you could propose technical objections or attractive alternatives at many points in the process.

Successful ANSI standards must then go through a very similar process at the ISO level. ANSI's multinational firms can continue to repeat the same delaying tactics in all their market countries and in all the appropriate ISO subunits in which a firm participates.

Still, you might think each country's vote is equal. Think again.

One can view standardization as the creation of a negotiated market centered

on the standard product and serving all participants' interests. Each one's vote influences the other voters in proportion to its contribution to that market. Experts suggest that the global information market will be \$1 trillion in the year 2000, with two-thirds of that in the U.S. ANSI should have a huge influence in standardization. On the other hand, IBM may have 70% of that market and influence.

A buyer's nature

A buyer requires buyers and products. Buyers contribute the primal energy: buying power. But historically, they have participated little in standardization activities. Vendors contribute products and access to their existing customer base. The X/Open Consortium began as

a joint action by several European vendors to create a market from shared customer bases as large and as attractive to independent software vendors as the IBM market is. The ISO Open Systems Interconnect's success in Europe shows vendors' willingness to share a negotiated market rather than facing IBM's Systems Network Architecture (SNA).

The General Agreement on Tariffs and Trade (GATT) reflects an attempt by over 80 countries to eliminate, among other hindrances to free trade, the use of standards as trade barriers. The GATT signers agree to prefer ISO standards to national standards unless extraordinary reasons prevent doing so.

In mainland China, a national standards group means a firm commitment to

the standard and, since this new standard will be used throughout the marketplace, users and vendors face reasonably predictable market consequences. Many ISO countries display similar dependence on ISO standards.

So how do voters compare at the ISO level? Obviously IBM, with its great research and development facilities, a giant customer base, demonstrated capability to proceed alone, continually growing market control and determination to win, will have immense power in ISO.

ANSI, on the other hand, will proceed slowly at the national level, with many delays and compromises watering down its standards.

The ANSI voting history will emphasize IBM's influence over its huge home market, while the protection of various niches by smaller vendors will produce fragmented markets and votes. Since a vote by ANSI in ISO is an indefinite commitment, it represents a weak signal about U.S. vendor intent or contribution to the negotiated market. Hardly a strong hand.

The major consequences of this reality fall on the U.S. user. For the user in China, it's a steel poker with only the hole card hidden. In the U.S., it's a draw poker.

Berg is editor in chief of the technical journal *Computer Standards and Interfaces* in Long Lake, Minn., and is a member of the steering committee for the International Symposium on Information Technology Standardization.

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Hard bits

CONTINUED FROM PAGE 27

thus, Mass.-based firm said its software emulation of IBM 5250 devices allows asynchronous terminals as well as 5250 terminal clusters to connect to a System/36, 38 or AS/400 via a Jupiter Technology system.

Software pricing ranges from \$800 to \$1,100 per system, according to the company.

San Diego, Calif.-based Scientific Computer Systems Corp. has announced the creation of two separate divisions — one to focus on marketing and developing its SC5-40 supercomputer and the other focused on Vectrovent, the company's recently announced high-speed communications product.

NCR Corp. recently signed up with the 88Open Consortium, an organization promoting the Motorola, Inc. reduced instruction set computing (RISC) processor. The addition brings the membership total to 30.

The group was formed earlier this year and includes Data General Corp. and Convergent Technologies, Inc.

According to NCR, Richard Herter, its director of hardware engineering located at the organization's facility based in San Diego, will serve on 88Open's board of directors.

Pratt & Whitney Corp. plans to hand over \$5 million to Digital Equipment Corp. for a five-year service agreement that will cover 150 VAX systems installed at the jet engine manufacturer.

The contract, according to the company, includes 24-hour-a-day support, remote diagnostic services and a toll-free hot line.



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 1h. Financial/Commercial/Healthcare/Insurance
 1i. Manufacturer of Computers, Computer Related
 1j. Systems of Equipment
 1k. Computer & CP Services, including Software/Services
 1l. Business/Training/Consulting
 1m. Computer/Peripheral Dealer/Distributor/Reseller
 1n. User Other
 1o. Vendor Other

2. TELEFUNCTION (Circle one) (Please specify)
 2a. Manufacturer
 2b. Non-Manufacturer, Not CP
 2c. Non-Manufacturer, Computer/Service
 2d. CP, Non-Manufacturer, Computer/Service
 2e. CP, Non-Manufacturer, Computer/Service
 2f. CP, Non-Manufacturer, Computer/Service
 2g. CP, Non-Manufacturer, Computer/Service
 2h. CP, Non-Manufacturer, Computer/Service
 2i. CP, Non-Manufacturer, Computer/Service
 2j. CP, Non-Manufacturer, Computer/Service
 2k. CP, Non-Manufacturer, Computer/Service
 2l. CP, Non-Manufacturer, Computer/Service
 2m. CP, Non-Manufacturer, Computer/Service
 2n. CP, Non-Manufacturer, Computer/Service
 2o. CP, Non-Manufacturer, Computer/Service
 2p. CP, Non-Manufacturer, Computer/Service
 2q. CP, Non-Manufacturer, Computer/Service
 2r. CP, Non-Manufacturer, Computer/Service
 2s. CP, Non-Manufacturer, Computer/Service
 2t. CP, Non-Manufacturer, Computer/Service
 2u. CP, Non-Manufacturer, Computer/Service
 2v. CP, Non-Manufacturer, Computer/Service
 2w. CP, Non-Manufacturer, Computer/Service
 2x. CP, Non-Manufacturer, Computer/Service
 2y. CP, Non-Manufacturer, Computer/Service
 2z. CP, Non-Manufacturer, Computer/Service

3. COMPUTER INVOLVEMENT (Circle one) (Please specify)
 3a. Manufacturer (other than computer)
 3b. Non-Manufacturer, Not CP
 3c. Non-Manufacturer, Computer/Service
 3d. CP, Non-Manufacturer, Computer/Service
 3e. CP, Non-Manufacturer, Computer/Service
 3f. CP, Non-Manufacturer, Computer/Service
 3g. CP, Non-Manufacturer, Computer/Service
 3h. CP, Non-Manufacturer, Computer/Service
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 3v. CP, Non-Manufacturer, Computer/Service
 3w. CP, Non-Manufacturer, Computer/Service
 3x. CP, Non-Manufacturer, Computer/Service
 3y. CP, Non-Manufacturer, Computer/Service
 3z. CP, Non-Manufacturer, Computer/Service

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1. BUSINESS-INDUSTRY (Circle one)
 1a. Manufacturer (other than computer)
 1b. Hardware/Software Retailer
 1c. Hardware/Educational
 1d. Hardware/Trade
 1e. Business Service (except CP)
 1f. Government — State/Federal/Local
 1g. Communications Systems/Trade/Utilities
 1h. Financial/Commercial/Healthcare/Insurance
 1i. Manufacturer of Computers, Computer Related
 1j. Systems of Equipment
 1k. Computer & CP Services, including Software/Services
 1l. Business/Training/Consulting
 1m. Computer/Peripheral Dealer/Distributor/Reseller
 1n. User Other
 1o. Vendor Other

2. TELEFUNCTION (Circle one) (Please specify)
 2a. Manufacturer
 2b. Non-Manufacturer, Not CP
 2c. Non-Manufacturer, Computer/Service
 2d. CP, Non-Manufacturer, Computer/Service
 2e. CP, Non-Manufacturer, Computer/Service
 2f. CP, Non-Manufacturer, Computer/Service
 2g. CP, Non-Manufacturer, Computer/Service
 2h. CP, Non-Manufacturer, Computer/Service
 2i. CP, Non-Manufacturer, Computer/Service
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 2y. CP, Non-Manufacturer, Computer/Service
 2z. CP, Non-Manufacturer, Computer/Service

3. COMPUTER INVOLVEMENT (Circle one) (Please specify)
 3a. Manufacturer (other than computer)
 3b. Non-Manufacturer, Not CP
 3c. Non-Manufacturer, Computer/Service
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NEW PRODUCTS —
SYSTEMS

Processors

Fujitsu Microsystems of America, Inc. has expanded its family of low-end, Pick Systems' Pick-based business computers. The system 22000/Model 60 is based on Motorola's 68020 processor with a clock rate of 16.67 MHz, the vendor said. The system incorporates 2M bytes of standard random-access memory, expandable to 6M bytes, and can accommodate up to four 139M-byte formatted hard disk drives. Running under Fujitsu's S.5.0 Pick operating system, the computer is priced at \$19,750.

Fujitsu, 3055 Orchard Drive, San Jose, Calif. 95134. 408-434-1160.

NCR Corp. has introduced a point-of-sale (POS) system designed to provide food service operators with uninterrupted customer service.

The NCR 2760 Food Service System is targeted at fast food and fine-dining restaurants, as well as food and beverage outlets in hotels, taverns, coffee shops and cafeterias. The system features intelligent POS terminals and an integrated personal computer-based workstation, which is connected on a local area network configured to switch from primary to backup stations in the event of a nonoperational terminal.

The 2760 Food Service System is available with a variety of peripherals and software and is priced from less than \$10,000.

NCR, 1334 S. Patterson Blvd., Dayton, Ohio. 45479. 800-225-5627.

A multiuser system that operates in a Unix environment has been announced by Point 4 Data Corp.

The Mark 386 Series incorporates a 20-MHz Intel Corp. 80386 processor chip and can support up to 17 users, the vendor said. The system can be configured with between 2M and 4M bytes of random-access memory and is available in three versions.

Pricing ranges from \$9,450 to \$11,750, depending on configuration.

Point 4, 15442 Del Amo Ave., Tulsa, Calif. 92680. 714-259-0777.

Data storage

A data storage server designed for technical workstation networks has been announced by Epoch Systems, Inc.

The Epoch-1 Infinite Storage Server was developed for departmental mechanical and electrical computer-aided engi-

neering environments and combines magnetic and optical disk drives in hierarchical architectures to provide up to 150G bytes of data storage capacity, the vendor said.

Based on the University of California at Berkeley Unix File System, the product incorporates a Winchester disk storage system and is priced from \$155,000 to \$450,000, depending on configuration.

Epoch Systems, 313 Boston Post Road West, Marlboro, Mass. 01752. 617-481-3717.

Systems Industries, Inc. has introduced a Unix-based portable drive test system for Digital Equipment Corp. computers.

SI Assist reportedly allows users to test hard drives online and diagnose disk drive and system problems. The unit weighs 25 pounds, and the standard configuration features 2M bytes of random-access memory and a 20M byte 3½-in. hard drive, the vendor said.

Scheduled for delivery this month, SI Assist will be priced at less than \$30,000.

Systems Industries, 560 Cotuitwood Drive, Milpitas, Calif. 95035. 408-432-1212.

Tandem Computers, Inc. has announced three memory modules designed for its line of Non-stop VLS systems.

The VLS Large Memory modules reportedly improve response time and throughput by increasing main memory capacity by up to six times, from 16M bytes to 96M bytes per processor.

The modules are available in three sizes — 16M bytes, 24M bytes and 48M bytes — and carry a price tag of \$54,500, \$75,000 and \$115,000 per module, respectively, the vendor said.

Tandem, Location 4-40, 19191 Valco Pkwy, Cupertino, Calif. 95014. 408-725-6000.

Several disk and tape subsystems for the Digital Equipment Corp. VAX environment have been announced by Emulex Corp.

The 8-in. SM700 series Storage Module Disk Interconnect subsystem, designed for DEC architectures, reportedly offers a maximum storage capacity of 10.5G bytes per cabinet and requires only six ports, the vendor said. Prices range from \$28,667 to \$167,334, depending on configuration.

Emulex's QD3400850 and QD3401230 SMD/E disk storage subsystems for DEC Microvax 3500 and 3600 computers are offered in configurations with one to four drives. Formatted capacities for these products

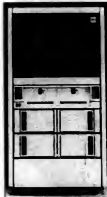
reportedly range from 741M bytes for a single-drive subsystem to more than 4G bytes for a four-drive subsystem.

The QD3400850 is priced from \$14,230 to \$48,110, and the price of the QD3401230 ranges from \$18,260 to \$64,200.

The SC14COX streaming-tape subsystem uses a Q114 tape controller and switch-selectable TMSCT/TSVOS tape subsystem emulations.

Incorporating a ¼-in. reel-to-reel tape drive with densities ranging from 1,600 to 6,250 bit/in., the unit is priced from \$10,770.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626. 714-462-5600.



Emulex subsystem for VAX

BASF Corp. Information Systems has announced an IBM 3480-compatible bread-cleaning cassette cartridge.

The BASF Cleaning Cartridge reportedly takes 45 sec. to cycle and allows the user to perform on-site drive maintenance as required. The cartridges are suitable for 500 cleanings each and are individually priced at \$19.50.

BASF, Crosby Drive, Bedford, Mass. 01730. 617-271-4064.

Unbound, Inc. has introduced a line of disk and tape subsystem products.

The Versa-Que 4000 Series Subsystems reportedly feature a single Motorola, Inc. Q-bus controller interface and high-speed synchronous small computer systems interface operation. The units are offered in configurations ranging from 380M to 4.5G bytes and are available in either tabletop or floor-mount packages.

Pricing ranges from \$4,595 to \$36,890.

Unbound, 15235 Springdale St., Huntington Beach, Calif. 92649. 800-862-6863.

U.S. Design Corp. has added two products to its Q-Stor family

of storage devices for Digital Equipment Corp. and Sun Microsystems, Inc. computers.

The QD storage system is reported to be a two-drive, tabletop enclosure with power supply as well as two small computer systems interface (SCSI) connectors.

The QD products start at \$3,055 for a 170M-byte configuration and reach \$11,700 for a 1,500M bytes of magnetic storage.

The Q8 is a four-drive rack-mount unit that features a power supply and two SCSI connectors, the vendor said.

The 170M-byte version costs \$4,350, and the 3,040M-byte configuration costs \$21,995.

U.S. Design, 4311 Forbes Blvd., Lanham, Md. 20706. 301-577-2880.

I/O devices

Dataproducts Corp. has announced a mid-range band printer, the LB 1015.

The device prints at a speed of 1,150 lines/min. using a 48-char. set and more than 1,000 lines/min. with a 64-char. set, the vendor said.

The unit has a reported mean time between failure rate of 5,500 hours and provides both serial and parallel connections.

The LB 1015 has a price tag of \$10,995.

Dataproducts, P.O. Box 746, 6200 Canoga Ave., Woodland Hills, Calif. 91365. 818-887-8000.

A single-band scanning terminal has been introduced by MSI Data Corp.

The Scanning Data Terminal (SDT) reportedly weighs 12 oz. and is eight in. long. It is especially suited for asset, files and packaged goods management, the vendor said.

The product is available with several configuration options, including a 20- or 31-key rubber keyboard, a 2- by 16-line LCD and either 32K or 64K bytes of memory.

The SDT costs \$795 and is scheduled to ship in January.

MSI, 340 Fischer Ave., Costa Mesa, Calif. 92626. 714-349-6000.

Messanettes, Inc. has announced that it has enhanced its Idea 197 line of IBM mid-range terminals to provide full IBM Application System/400 compatibility.

The units attach directly to the AS/400, the IBM System/34, 36 and 38 and the IBM 5294 or 5394 controller via two-axial cable.

The enhanced hardware supports a T-connector that allows users to remove a terminal from the two-axial cable without disrupting its operations, according to the vendor. The terminals also reportedly feature direct support for ASCII serial input devices.

Pricing ranges from \$1,195 to \$1,495.

Messanettes, 29 Dunham Road, Billerica, Mass. 01821. 508-663-6878.

A 12 page/min. laser printer with Adobe Systems, Inc. Postscript capabilities has been announced by Data General Corp.

The Model 6460 also features Hewlett-Packard Co. LaserJet Plus emulation, 4M bytes of memory and 300 by 300 dot/in. resolution.

The product is recommended for a 10,000 page per month duty cycle and has a price tag of \$7,995.

DG, 3400 Computer Drive, Westborough, Mass. 01580. 508-898-4051.

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NEW PRODUCTS — SOFTWARE

Development tools

A software development package that reportedly provides an environment for the creation of a 32-bit IBM Personal Computer AT real-time Unix-compatible platform has been introduced by Alycon Corp.

According to the vendor, the Regulus-386 Builder is a development kit that is sized at Intel Corp. 80386-based systems. The software package includes a C compiler, assembler, linker and debugger as well as a proprietary operating system.

The Regulus-386 Builder costs \$11,500.

Alycon, 6888 Nancy Ridge Drive, San Diego, Calif. 92121, 619-587-1155.

A development tool that permits engineers to perform interactive, animated simulations of embedded real-time system designs has been introduced by Athena Systems, Inc.

Called Foresight, the graphics-based product was designed to run on a Sun Microsystems, Inc. workstation under Unix with the X Window System and is scheduled for release this month.

According to the company, a 10-user license will cost \$23,680.

Athena Systems, 139 Kifer Court, Sunnyvale, Calif. 94086, 408-730-2100.

Intellicorp, Inc. has introduced an expert-system design training package for use with Sun Microsystems, Inc., Symbolics, Inc. and Digital Equipment Corp. Vaxstation machines, as well as Intel Corp. 80386-based processors. Called Keetrator, the package contains two videocassette tapes, training software and five sets of tutorial modules covering the basic features of the company's Knowledge Engineering Environment system.

Keetrator costs \$5,000. Intellicorp, 1975 El Camino Real W., Mountain View, Calif. 94040, 415-965-5500.

DSI Communications, Inc. has announced the first commercial release of Ultratools, the company's package for Unix-based systems.

Primarily for use by application developers, the integrated software provides interface programming tools for character-based displays, the vendor said. These include menu and form script design capabilities that utilize English-like statements. The package is priced from \$299, and is currently available in 286/Xenix, 386/Xenix and VAX/VMS versions.

DSI, 333 W. Merrick Road, Valley Stream, N.Y. 11580, 516-672-3535.

Tommy, Inc. has ported its Mach 1 application development environment to The Santa Cruz Operation's SCC Xenix operating system.

According to the company, this will bring the database management system and application generation capabilities of the Mach 1 to multiuser microcomputers.

Mach 1 for multiuser Xenix is priced at \$1,500 for one to four users (runtime, \$750) and \$2,250 for five or more users (runtime, \$1,125).

Tommy, 4221 Mahabury Road, Cincinnati, Ohio 45242, 513-964-6605.

Languages

Telesoft Co. has introduced the Telegen3 Optimizing Compiler, a second-generation compilation system written entirely in Ada.

Designed for Sun Microsystems, Inc.'s Sun-3 workstations, the software is twice as fast as other available Ada compilers and provides extensive range and flow analysis functions, according to the vendor.

Scheduled for shipment in the second quarter of 1989, the Telegen3 Optimizing Compiler for Sun-3 workstations will

be priced at \$7,500, according to Telesoft.

Telesoft, 5959 Cornerstone Court W., San Diego, Calif. 92121, 619-457-2700.

Micro Focus, Inc. has announced its Cobol/2 compiler package for The Santa Cruz Operation's Xenix System V operating system.

The compiler was reportedly designed to provide a high-performance business applications platform for Xenix systems based on the Intel Corp. 80386 microprocessor.

The package is priced at \$3,000, and a runtime-only version is available for \$400.

Micro Focus, 2465 E. Bayshore Road, Palo Alto, Calif. 94303, 415-856-4161.

Applications packages

Computer Solutions, Inc. has released Growthpower Data Collection, a software module designed to integrate with other proprietary modules, to aid the manufacturing industry.

The system runs on Hewlett-Packard Co.'s 3000 series minicomputers, and program capabilities include shop-floor data collection, material control and shipping and receiving functions.

It is priced from \$8,500 to \$20,500, depending on module configuration.

Computer Solutions, 1 Burlington Woods, Burlington, Mass. 08103, 617-229-2200.

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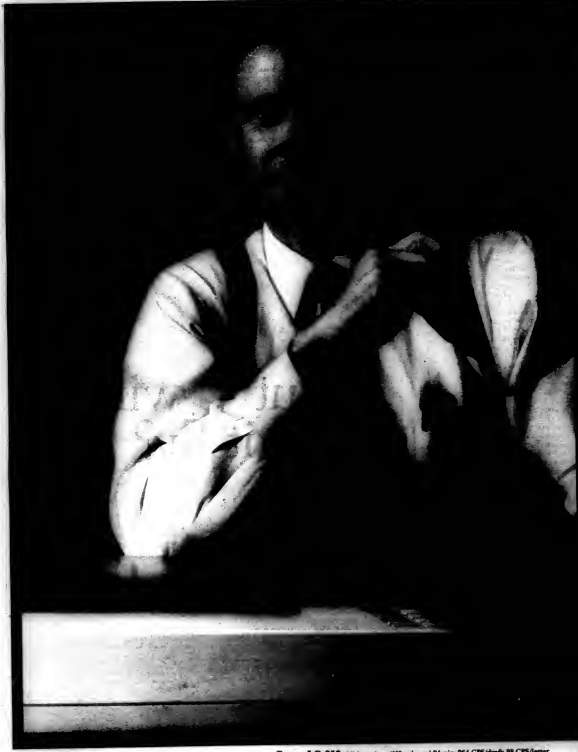
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Tesseract Corp. has enhanced its Human Resource Management System (HRMS).

Designed to run on IBM and compatible mainframes, the product now operates under IBM's DB2 relational database management system in both CICS and IMS/DC environments, the vendor said. Additional features include an on-line Help function and restart and re-

covery facilities.

The HRMS series is priced from \$90,000.

Tesseract, P.O. Box 7658, 150 Spear St., 10th Floor, San Francisco, Calif. 94120. 415-543-9320.

Sybase, Inc. has announced the APT Workbench, a set of application productivity tools for designing, prototyping and

maintaining forms-based, on-line applications.

All components are scheduled to be commercially available on Sun Microsystems, Inc.'s workstations under Unix and Digital Equipment Corp. VAX computers under VMS in the first quarter of 1989. Pricing will range from \$9,600 to \$76,800, depending on hardware platform and CPU size.

Sybase, 6475 Christie Ave., Emeryville, Calif. 94608. 415-596-3500.

Xerox Corp. has announced an enhanced version of Analyst, a software package that runs in its Smalltalk-80 environment.

The product is used by developers, researchers and end users to analyze large volumes of data, the vendor said. Version 3.0

reportedly offers spreadsheets and forms functions.

Analyst 3.0 is priced at \$1,995 and runs on Sun Microsystems, Inc. Sun-2 and Sun-3 workstations as well as Telextron, Inc. and Xerox systems.

Xerox, 101 Continental Blvd., El Segundo, Calif. 90245. 213-536-7000.

Utilities

A program designed to reduce the amount of time necessary for construction data management requests in an IBM MVS operating environment is now available from Advanced Software Products Group, Inc.

ADMS transmits all requests on-line via IBM's TSO and ISPF screens and can print and confirm historical request data, the vendor said. It costs \$9,500.

Advanced Software Products, Suite 401, 2335 Tamiami Trail N., Naples, Fla. 33940. 800-662-6090.

A file management utility for Digital Equipment Corp. VAX/VMS systems has been introduced by Digi-Com Group, Inc.

V-Dir reportedly simplifies VMS file management by allowing users to see files on screen in a directory much as they would appear in an editor. The software runs with DEC's VT100, VT200 and VT300 terminals and will support directory search lists on clustered VAX systems.

V-Dir costs \$395. Digi-Com, Suite W5E, 420 E. 64th St., New York, N.Y. 10021. 212-306-5981.

Devlin, Thomas and Associates, Inc. has released Version 3.1 of DTA/PRINT, the company's remote print distribution software for access to on-line spooling from CICS applications programs.

The latest version of the program supports the IBM DOS/VSE/SP 4 operating system as well as VM Release 5.0.

The base price is \$6,000 plus \$2,000 for the VM interface.

Devlin, Thomas and Associates, 550 Waterford Park, 505 N. Country Road 18, Minneapolis, Minn. 55441. 612-591-6100.

VM Software, Inc. has announced Vmspool Release 2.0 for IBM's VM environment.

The latest version reportedly includes a full spool backup and restore facility that allows sites to back up all or selected spool files to tape using a variety of criteria such as file name, file type, data, age and size. It maintains a complete catalog of spool files on tape, according to the vendor.

Vmspool 2.0 is priced from \$3,250 to \$19,250, depending on CPU group.

VM Software, 1800 Alexander Bell Drive, Reston, Va. 22091. 703-264-8000.

NATURAL 2 turns on DB2.



Nothing makes DB2 come alive like NATURAL 2, Software AG's 4th Generation applications development technology.

NATURAL 2 provides unsurpassed functionality for the quick development of high-performance production applications which are data independent, accessing files in DB2, IMS/DC, and VSAM environments.

Regardless of the environment, NATURAL 2 provides users with one consistent, friendly interface. Its intelligent editors, online help, graphic support, and windowing technology are unmatched in any other 4th Generation development product, and make NATURAL 2 easy to learn and use.

Better yet, NATURAL 2 applications can continue to grow as you grow, into new operating systems (MVS, VM, VSE), data base management systems (VSAM, DB2, IMS/DC), and TP monitors (IMS/DC, CICS, COM-PILE, TSO, CMS). And, using Software AG's relational DBMS, ADABAS, the same programs can run unchanged on different hardware platforms, such as Digital and Wang.

Best of all, NATURAL 2 offers full integration with the technologies you'll need to energize DB2 for years to come. Software AG's PREDICT provides a central repository for business processing rules and data definitions. The NATURAL Optimizer allows your applications to perform as well as COBOL applications—or better. And a host of other technologies provided within our open Integrated Software Architecture (ISA) create an environment where DB2 can really shine.

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NATURAL 2 application development technology serves as a component of Software AG's open Integrated Software Architecture (ISA). Everything you need to program business success.

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XEROX

**Shouldn't your printer
be as smart
as your computer?**

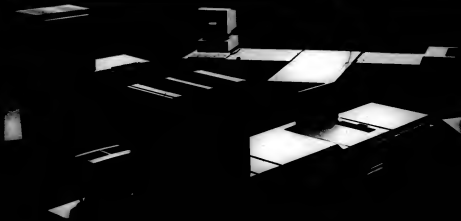
Xerox Intelligent Printing Systems. Printing systems

Low data center productivity. It still persists despite billions spent on data processing technology. Could the problem be smart computers lashed to not-so-smart printers?

The solution is intelligent printing systems from Xerox, leader in document processing. Unlike other printers, they have the power, the capability and the intelligence to produce complex documents from computer data without tying up your host computer in the printing process.

Xerox Intelligent Printing Systems merge text with graphics, and forms with data, to give your documents publishing house quality. Documents can be printed on multiple paper weights, colors and sizes. And Xerox Intelligent Printing Systems' recent announcement of 50 ppm 600 x 600 dpi resolution means a new benchmark in electronic printing. Selected applications can now feature half tones and the smallest of type sizes as a part of day-by-day data center operation.

While your document quality can be far higher, your costs can actually be far lower. Because Xerox Intelligent Printing Systems can think and work on their own, expensive CPU resources aren't tied up in the printing process. Your organization's forms, logos and signatures are stored on the printer, eliminating preprinted stocks. Outside printing costs can be drastically reduced because Xerox Intelligent Printing Systems' document quality allows you to bring complex jobs in house.



XEROX

as smart as your information system.

Xerox Intelligent Printing Systems, like your computer, can be programmed to deliver with leading-edge efficiency. They load while running for continuous operation. Using another Xerox exclusive, magnetic ink character recognition (MICR), negotiable document production can be cut from seven steps to one.

Xerox Intelligent Printing Systems include the premium quality, high-volume 9790 and 8790 systems; solid, productive mid-volume systems

like the 4050, the 4075 and the 3700 for data centers and distributed locations; and the versatile low-volume 4045 for office and terminal-network environments. There's also the newly introduced 92 ppm 4090 for the ultimate in mid-volume productivity and the 4650 with 600 x 600 spi resolution. Team Xerox professionals have already converted thousands of data centers to electronic printing—Xerox Intelligent Printing Systems are compatible with virtually every mainframe—and as a result have specific applications

developed, proven and ready to put in place for you today. By installing a printer as smart as your computer, you'll not only increase printing quality, but gain a quantifiable competitive edge through superior applications documents.

Xerox Intelligent Printing Systems are a vital part of Xerox leadership in document processing. Whether creating, copying, distributing or filing, we turn ideas and information into electronic and print documents that are superior in look and content.



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Smart printers, smarter applications.

It's one thing to improve printing quality, another to dramatically improve your printing applications. This is what intelligence in printing is all about.

Take insurance, for example. Xerox Intelligent Printing Systems allow forms and page formatting instructions to be stored at the printer. As a result, policies can be printed without the need for preprinted forms and without costly hand assembly. With Xerox MICR printing techniques, payment checks can be printed on the claim settlement document itself at the same time! Xerox

Supplies Division supplies safety papers, preperforated and die-cut stocks, labels and transparencies in addition to cut sheet paper that sets industry standards for paper quality. This level of applications productivity improvements also applies to banking, manufacturing, retailing and finance. As of today, 85% of the *Fortune* 500 companies are using Xerox Intelligent Printing Systems to give their applications documents a competitive edge.

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MICROCOMPUTING

MICRO BITS

Douglas Barney

We are being slighted

As a matter of fact, you are chopped liver. You ought to be distressed by the shabby way PC vendors treat their customers. It's not high prices, the stupid spinning of markets into multiple standards or outright lies that are at issue. No, it's the way these vendors communicate with customers.

At the center of this is the preferential treatment given to business news publications such as *The Wall Street Journal*, *Businessweek* and sometimes *The New York Times*, all of which represent the investors who support the stock price. Too often, the publications that represent customers—who support the vendors' very existence—are left to play second fiddle.

So why is it that so many vendors view investors as more important than customers? Because they are fixated on their own stock holdings and anxious to boost the value by whatever means possible, that's why. And just as often, company executives are obsessed with being quoted in publications their colleagues build read. You can't

Continued on page 58

Cheaper PCs are still expensive

Average price \$5K to \$6K per user; high-end setups estimated at \$7.5K

BY WILLIAM BRANDEL
OF STAFF

While PCs may be getting cheaper, the overall cost of using them is not. However, businesses are discovering that their return on investment is paying dividends at an increasing rate, according to recent market data.

This finding is cited by Nolan, Norton & Co., a Lexington, Mass.-based research firm that investigated personal computer cost and ownership for Lotus Development Corp. in Cambridge, Mass. The report noted that PC hardware represents less than 10% of ownership costs.

The primary cost lies in technical support and service, said Tom Johnson, director of the Nolan Norton Institute, also based in Lexington.

Nolan Norton Institute's data

indicated that hardware and software account for less than 30% of the direct investment in a PC, while support expenses usually exceed 50% of the cost. The firm also predicted that end-user computing costs will account for 41% of the corporate information services budget by 1990, as compared with 30% in 1986.

Highs and lows

An average price for a single-user PC in a business organization is \$5,000 to \$6,000, which includes a no-frills PC, an impact printer, an operating system and a couple of basic software applications.

At the high end, a single-user PC costs approximately \$7,500 per user, said Mike Lowther, data processing supervisor at Fina Oil & Co. in Dallas. Lowther said the company's costs run higher because it uses IBM Per-

sonal System/2 Model 60s, which the company believes can be more productive than the average PC.

Jon Duffy, a partner at KPMG Peat Marwick, a Toronto-based research firm, said companies such as Fina could benefit much more by increasing its PC technology investment.

"Purchase quality should be viewed for application usage, not price point," Duffy said. "As you move up to more complex applications and build it into the organizational cost and develop applications as part of the corporate infrastructure, the cost can easily find itself in the \$15,000 range" per year.

Continued on page 60

Expert systems on campus

BY MICHAEL ALEXANDER
OF STAFF

Many end users will remember the days when, as students, they spent hours searching library stacks to find obscure bits of information for term papers and other reports. But today's students, at least those at Goucher College in Towson, Md., can quickly find the information they need using an expert system running on an IBM Personal Computer XT.

The Biographical Reference
Continued on page 60

Defensive postures

Managers take steps to protect vulnerable LANs

BY MICHAEL ALEXANDER
OF STAFF

The recent epidemic of computer viruses has caused many information services managers to pay closer attention to the security of their local-area networks.

LANs are particularly vulnerable to contamination because viruses can enter the systems in several ways: borne by a nascent or freeware program, left behind by a disgruntled former employee or shot into the system by a customer linked to an electronic data interchange network.

Also, end users tend to interact in a more casual, open-ended fashion on personal computer networks than they do on mainframe systems and may not be mindful of proper security procedures.

Continued on page 60

Data View

Diskless PC outlook

Analysts predict the U.S. market will grow at a compound annual rate of 63% through 1992



Answers to two of these questions.

Are you developing mainframe COBOL, CICS or IMS applications?

Is your development environment sometimes counter-productive?

Would you like to continue to program and test when the mainframe is down, slow, restricted or sixty miles away?

Would you like to utilize the industry's best source code debugger to double your productivity?

Could you develop CICS or IMS applications faster if you were free from the burden of TSO, poor response time and system crashes?

Do you want to develop and test massive programs and many megabyte data files on a PC without concern for the 640KB barrier?

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IBM displays are getting attached to DEC, Data General and Prime computers.

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It's not surprising, IBM 3151 displays are inexpensive both to buy and own. Model 160 starts at \$399*, including one-year warranty. Other models are available with a 3-year warranty. Add an IBM Maintenance Agreement, and you'll get five years of IBM service for just \$54.

The 3151 family of displays provides most of the popular emulations compatible with DEC™, Wyse®, Data General®, TeleVideo® and more. Models 310 and 410 utilize unique cartridges which provide additional capabilities: auto dial, PC compatibility and concurrent dual host connectivity.

IBM ASCII displays are everything you'd expect from the company that ships more terminals than anyone. All models are equipped with high-quality IBM keyboards, designed for use with your ASCII applications. Non-glare 14" flat screens in green or amber/gold provide crisp character resolution.

How can you get attached to an IBM ASCII terminal?

For a free brochure and to find a distributor near you, call 1-800-IBM-7257 ext. 84. Or call your IBM Marketing Representative.

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REVIEWS/NEW PRODUCTS

Everex launches top performer

In the ongoing battle for 386 supremacy, Everex Systems, Inc.'s Computer Systems Division has unleashed its top gun. Called the Step 386/25, this speed burner is powered by Intel Corp.'s latest processor, the 25-MHz 80386. With zero-wait states and its own Advanced Memory Management Architecture (AMMA) memory-cache controller, the Step 386/25 finished first in our CPU performance trials.

Features: The three models of the Everex Step 386/25 differ only in the amount of on-board memory. The starting version has 1M byte of random-access memory and 64K bytes of RAM cache memory and lists for \$6,399. Going up a model gives you 4M bytes of memory and boosts the price to \$9,799. The top model is loaded with 8M bytes of main memory and 128K bytes of cache memory and lists for \$13,899.

The Step has the same color

and layout as the IBM Personal Computer AT, but its recessed front panel features a speaker switch, an eight-character LED status display, a three-position speed switch and the usual key lock and reset button.

There are five half-height bays on the Step 386/25. One standard 1.2M-byte 5-in. drive is included with the system. The system's large internal drive capacity is backed by a 200W power supply.

The Step 386/25 comes with a 101-key extended keyboard, with function keys across the top. The system's main board has six 18-bit AT-style slots, one of which is occupied by the drive controller card; one 8-bit slot; and one proprietary 32-bit slot for the optional system expansion card.

The Step 386/25 uses 256K-byte or 1M-byte single LU line memory modules (SIMM). The main board has sockets for up to eight SIMMs and 16 static-cache memory chips. Everex uses its own memory management system, AMMA, instead of Intel's 82345 cache controller chip. The Step's dual-purpose coprocessor socket accepts the

Intel 80387-25 math coprocessor and Everex's 80387-25 3167 adapter board.

Bundled software includes hard disk diagnostics and utilities, general utilities and Microsoft Corp.'s MS-DOS 3.3 with GW-Basic.

Performance: Essentially, we tested the Everex 386/25 with our standard 386 test suite, with memory cache and disk caching disabled. Our test unit had 4M bytes of RAM on four 1M-byte 160-msec SIMMs, 64K bytes of cache memory on eight 25-msec static chips, a 160M-byte Control Data Corp. hard disk and an Everex Enhanced Graphics Adapter video board.

In CPU speed, the Step 386/25 earned the highest rating we have ever recorded; disk speed tests turned up the fastest time we have scored. In software throughput tests, the Step 386/25 proved to be just as quick.

The Step passed all our software compatibility tests and sailed through our hardware compatibility tests with an IBM Video Graphics Array board, an



internal 2,400 bit/sec. model and an Ethernet network board all functioning properly when installed at the same time. We tried to test the system with an IBM Token-Ring adapter, but we were able to get only an "OK" on the board diagnostics.

This is attributed to incompatibility between IBM's software and the enhanced small-device interface drive.

Documentation: Very good. Everex ships a 178-page spiral-bound users guide with the Step 386/25. There is a complete table of contents and index as well as a chapter for new users. The manual includes an explanation of the AMMA memory cache, plus detailed discussions on setup. Unfortunately, there is no glossary, the troubleshooting section is brief, and the technical specifications page is missing.

Setup: Good. Because Everex does not market the Step 386/25 as fully configured, the amount of time it takes to get the system running varies greatly. An outstanding feature is the read-only memory (ROM)-based Setup utility. The system's main board has no DIP switches or jumpers. Configuration changes are handled by the enhanced ROM-based utility, the another Erasable programmable read-only memory. Adding more memory is fairly simple because of the very accessible SIMM slots.

Ease of use: Very good. The Step 386/25 looks and feels like any AT-style computer with several added features. The three-position speed switch al-

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Form generation tool features file flexibility

Form Easy, published by Graphics Development International, Inc., allows users to complete forms using existing data sources. The program has the flexibility to import files from various word processors, databases and spreadsheets. You can also import graphics files from Lotus Development Corp.'s 1-2-

3 and PC Paintbrush and use Form Easy's scanning module to bring in images and do simple editing.

Features: Form Easy, Version 3.0B includes 17 sample forms along with eight sample source documents to be used with the tutorial. A macro capability allows the user to embed a



command to print a database query onto a form in a batch procedure. This enables the merging of data as to forms directly from DOS or from any database, editing when necessary, and printing on the selected printer.

Form Easy requires 512K bytes of memory, IBM PC-DOS 2.0 or higher and a hard disk for the full package. A runtime version can operate on floppies. Color graphics capability is another significant enhancement to earlier versions. Although Form Easy is primarily designed for use with laser printers to take advantage of varying fonts, a dot matrix printer with graphics capability also works. We tried it out on both a Hewlett-Packard Co. laser printer and a nine-pin Epson America, Inc. dot matrix printer.

Form Easy is available in a

Continued on page 45

Removable media pack is speedy

Tandon Corp.'s Personal Data Pac removable drive subsystems combine the speed and capacity of a removable Winchester hard disk with the reliability of a Bernoulli disk.

Features: The Tandon Personal Data Pac consists of two pieces: the Data Pac removable media, which includes the drive mechanism and is shock-mount-

ed inside a rugged plastic shell; and the drive receptacle, which contains most of the drive's electronics. By including the drive in the removable media pack, Tandon added reliability, and by splitting the electronics from the drive, the company reduced the cost of the removable media.

The system has a capacity of 30M bytes and an average effective access time of 40 msec, according to the vendor. Each Data Pac weighs 2.6 pounds. The Data Pacs were meant to be transported. The case and shock mounting were designed to protect the disk drive from the effects of an 18-in. drop onto a hard floor or a 24-in. fall onto

Continued on page 49



Graphics Development's Form Easy works for in-house use

What you've been doing.



*On your 286,
you've been making any task look complicated.*



*On your 386,
it hasn't been incredibly exciting having all that power.*

If the screens on the right look more intriguing to you than those on the left, you're ready for Microsoft® Windows.

Windows opens up the world of visual thinking to all 286 and 386 owners by offering the power of graphics.

Everything you can do on your PC, you can now do better, faster and with greater imagination. Whether you're creating documents or trying to get a clearer picture of your work.

What used to take complicated key-strokes can now be accomplished with the simple click of a mouse. With Microsoft Windows, you access pull-down menus. Simultaneously work with different programs as well as cut and paste between them to create graphic examples within different bodies of text. And what you see on the screen will appear on your printed page.

And once you've learned Microsoft Windows, you'll have the basis for scores of other programs because all the countless new Windows applications are based on the same easy, logical format.

Since Microsoft Windows virtually looks and works like MS® OS/2 Presentation Manager, you won't have to worry about it becoming obsolete in a couple years. We made both systems compatible. So, in the future, you'll be able to share data between them. And your knowledge of Windows will give you a jump on learning MS OS/2 Presentation Manager.

You'd expect a program this powerful to require a more powerful machine. But we consistently create software that makes

*Stop playing with
ancient instruments.
Now cutting and pasting is
a simple point and click
with the Microsoft Mouse.*

What you could have been doing.



*With Windows/286,
you could have been seeing things much more clearly.*



*With Windows/386,
you could have been seeing a lot more things much more clearly.*

the best use of your present hardware.

For example, Microsoft Windows/286 will work with as little as 640K and

instantly make your machine more sensitive, intuitive and highly visual. It gives you the ability to run every Windows application available.

And with access to all those powerful programs, you'll be able to extend the life and usefulness of your 286 well beyond the introduction of MS OS/2 Presentation Manager. With version 2.1 you also get the benefit of increased speed. So you'll blaze through Windows applications up to 87% faster.

Microsoft Windows/386 will give you everything that Windows/286 gives you. Plus multitasking with most DOS applications. Now you can finally utilize the speed and power of any 386 machine.

Imagine creating a complicated spreadsheet. Then while a macro is being run, open up a word processor. Type a document, open and

work with a graphics program. Cut and paste between programs and even call up electronic mail. And still be able to check on the status of your spreadsheet at any time.

Considering all you can do with Microsoft Windows, you have only one question to ask yourself.

What have you been doing without it?

Microsoft
Making it all make sense.

Form

FROM PAGE 43

runtime version at \$295 for users once forms and relational database files have been defined.

The runtime version allows the user to access any saved form, enter the information and print it, but it does not allow modification or creation of forms

or databases.

Performance: Very good. Form Easy has five operations that can be selected from the main menu: editing a form, filling a form, merging information to a form, changing printer selection and exiting to the operating system.

Selection of the edit function allows modification of any of the existing forms as well as creation

of new forms of any type. This option gives the user access to all the word processing and form design functions in the package. A significant library of forms can be stored and reused with a minimum of effort.

Documentation: Good. Form Easy's documentation comes in a hardcover book with four 5-in. diskettes. It offers a table of contents and index, a 10-

page quick reference guide and a 26-page tutorial.

Ease of learning: Very good. Any user, regardless of experience with forms software, must have a reasonable understanding of the laser printer and its fonts. Actual installation is accomplished by one command and a response to several prompts. We took about 20 minutes to get going, and novices should be run-

ning within an hour.

Ease of use: Very good. Form Easy is one of the easiest software packages on the market in which to construct and complete forms. The excellent use of menus and function keys add up to a responsive package.

Error handling: Satisfactory. Form Easy has minimal error-handling capabilities; fortunately, there is not much to go wrong. If you lose power or crash, you will lose your work since the last save, but you cannot damage your source data files.

Support: Good. The vendor offers a 90-day warranty as well as an extended support program for corporate customers. Support hours are Monday through Friday from 8:30 a.m. to 5 p.m., Pacific time. The technical support section does not have a toll-free number.

We made several calls to the Form Easy support service and only once had to leave a message, which was returned within 30 minutes.

Value: Very good. Form Easy costs \$495 and is a fine addition for those who create, manage and complete forms as well as for those who incorporate graphics and text from various sources into a single document.

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Increased reliability and lower costs are only two of the benefits of EMC's 4381 upgrades. What's more, each EMC upgrade is backed by EMC's Critical Site Service Plan. This plan includes an On-Site Spares Kit and a worldwide network of Service and Support Offices to guarantee prompt assistance from our Customer Service Engineers.

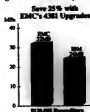
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For more information call today: 1-800-222-EMC2 (In MA, 508-435-1000).

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Everex

FROM PAGE 43

lows the user to set the CPU clock speed at 8.3, 12.5, or 25 MHz. Alongside the switch are LEDs to confirm the speed setting. The eight-character display on the front panel and the speaker switch are also useful.

Serviceability: Good to very good. The Step 386/25 case is solid and well-machined. Our sample unit's main board was clean and generally laid out well. However, removing the main board was not as easy as it could be. One of the mounting screws was located under the hard drive mounting platform.

The Step 386/25 has a one-year warranty from the date of purchase. Repairs are handled through dealers or, if necessary, directly through Everex. On-site service is available through a national service company or from dealers. Everex maintains a toll-free number for technical support from 8 a.m. to 5 p.m., Pacific time. Support policies rate as very good.

In many cases technical support we got through with no delays. The technicians were polite and generally well-informed.

Value: Very good. The Step 386/25 has speed, expandability and competitive pricing. The system we tested has a base cost of \$9,799 for the machine with 4M bytes of RAM. In addition, the hard drive is \$2,399, the EGA card costs \$199 and the EGA monitor is \$399.

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**HEWLETT
PACKARD**

Removable media

CONTINUED FROM PAGE 43

carpeting. In addition, when the Tandon drive parks its heads, it lifts the heads off the surface of the disk.

The removable system comes in two forms: The first is the A-Pac drive subsystem, a complete package that lets you retrofit your existing desktop computer with the Tandem system. The package consists of the removable Personal Data Pac, one or more external drive receptacles and one of three relocating linking loader (RLL) controller cards: an 8-bit IBM Personal Computer XT, 16-bit PC AT or 16-bit Personal System/2 Micro Channel Architecture card. A cable connects the receptacle cabinet to the controller card. The controllers come standard with a 128K-byte hardware disk cache buffer.

The other form is a complete Tandon desktop computer system with built-in Personal Data Pac. Possible configurations include the 6-MHz Tandon Pac 286 or 10-MHz Tandon Pac 286 Plus, both with two receptacles, and the 20-MHz Tandon 386 with one receptacle and a 110M-byte fixed hard disk.

Performance: Satisfactory to very good. We evaluated both the Ad- Pac single-drive add-on subsystem and the 10-MHz Pac 286 Plus desktop computer with integral Data Pac drive. Compared with other 10-MHz 286-based systems, the Tandem desktop held its own, earning a good rating for CPU speed. The Tandem disk spins at the same speed as standard fixed disks. Use of RLL recording allows Tandem to put 24 sectors on each track instead of 17. The Tandem earned a satisfactory rating in both sequential access performance and random performance.

The Tandon 286 desktop system proved to be compatible with our standard software and hardware test suite, earning a very good score for compatibility. When we first received the Ad-Pac add-on subsystem, we could not get it to work in any system. Tandon replaced our RLL controller board and fixed the problem. The replacement board disabled zero-wait state access for read-only memory calls, which some systems cannot handle properly. After we made the change, the board worked well in a variety of systems, earning a good score for hardware compatibility.

We had little trouble expanding the desktop computer system. We score expandability as very good.

Documentation: Very Good to Excellent. The manual for the Pac 286 contains everything needed to know to install and use the system. The two manuals that come with the Ad-Pac subsystem are comprehensive and clearly written.

Setup: Good to very good. Setting up the Ad-Pac subsystem is easy if you follow the instructions in the manual. Setting up the Pac 286 desktop is just a matter of unpacking everything, plugging it together and starting the system.

Ease of use: Good. The Data Pacs are simple to use. With system power on, you insert the Data Pac into the empty receptacle until the drive captures it and pulls it home. The drive then starts up automatically. When you command the system to eject the drive, the Data Pac spins down, parks and lifts the heads and pushes the drive so you can pull it out the rest of the way. There is no way to re-

move a disk without power.

The Pac 286 system is a minitower that can sit on your desk. The power switch is on the front, and the reset switch is well protected.

Serviceability: Satisfactory to very good. To find out how rugged the Personal Data Pac is, we shipped it around the country by United Parcel Service. We also put a Data Pac in checked luggage for a transcontinental trip and dropped some on the floor a few times. We didn't experience any jolt-related failures. We also had no trouble trading Data Pacs among several drives in different locations.

We found it very difficult to take the Ad-Pac drive receptacle apart, but it was well worth the work. The single-printed

circuit board uses surface-mount components. The revision H board had a handful of wires and three components tacked onto the board, but the workmanship on the changes was superb. The Pac 286 showed no last-minute changes and was ruggedly built. Both products earn a very good rating for workmanship.

The products carry one-year warranties. Support is supplied by your dealer, but we were able to get help directly from Tandon. We score support policies satisfactory.

Technical support for the Pac 286 system rates good, with the technicians giving us quick, accurate answers to our questions. Since we had real trouble with the Ad-Pac subsystem, the technical support staff had a chance to demonstrate

their strong knowledge of the product. We rate technical support on the Ad Pac subsystem as very good.

Value: Satisfactory to very good. The 10-MHz Pac 286 Plus with a two-drive Personal Data Pac subsystem has a list price of \$3,199. Remember to add two 30M-byte Data Pacs — which raises the cost to \$3,997 — a monitor and a display adapter. The result is a bit expensive for a 10-MHz system. We rate the Pac 286 a satisfactory value.

The single-drive Ad-Pac subsystem is more of a bargain at \$599, plus \$399 for a 30M-byte Data Pac. It offers more durable media than the competition, somewhat higher performance and higher storage capacity. We rate the Ad-Pac as a very good value.

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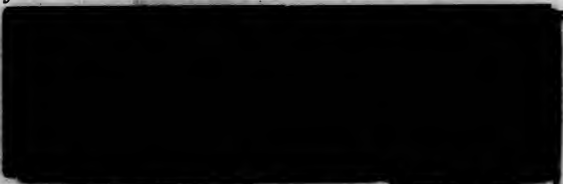
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NEW PRODUCTS

Systems

Tandon Computer Corp. has introduced three 16- and 20-MHz Intel Corp. 80386-based systems.

The announcements include the Tandon 386/16 Model 40, the 386/20 Model 40 and the 386/20 Model 110. All three systems are reported to be 32-bit, full-size conventional desktop units. Standard features include eight slots, 190W switchable power supply and serial and parallel ports.

Pricing for the systems ranges from \$4,999 to \$7,999.

Tandon, 405 Science Drive, Moorpark, Calif. 93021. 805-523-0340.

Toshiba America's Information Systems Division has reduced prices by \$300 on two of its portable personal computers.

The 15-pound Intel Corp. 80386-based TS100 is now priced at \$7,199. The 19-pound TS200 is based on Intel's 80286 chip and now costs \$5,499. Both units reportedly include a 40M-byte hard drive and IBM Enhanced Graphics Adapter display system.

Toshiba, 9740 Irvine Blvd., Irvine, Calif. 92718. 714-583-3000.

PC Craft, Inc. has expanded its family of personal computers with the addition of three tower and desktop systems.

According to the vendor, the tower PCC 2400/25 runs at 25 MHz with keyboard-selectable speeds of 25, 16 and 8 MHz. It is priced at \$3,740.

The PCC 2200/16 is reported to be a 16-MHz desktop model based on the Intel Corp. 80386 processor. The unit includes 1M byte of random-access memory, expandable to 16M bytes, and costs \$3,385.

The PCC 2100/20 is marketed for non-386-specific applications, the vendor said. The IBM Personal Computer AT-compatible base system offers a keyboard-selectable choice of 20-, 16- and 8-MHz speeds and zero- or one-wait state,

depending on the speed of the RAM used. It costs \$2,200.

PC Craft, 530 E. Jamie Ave., La Habra, Calif. 90631. 714-758-8600.



PC Craft's 2400/25 runs at 25 MHz

Software applications packages

National Management Systems Ltd. has announced Version 3.2 of its National Sales Manager's Workstation.

The latest version can be customized to accept any prospect or client record format and can automatically load prospect files obtained from marketing service organizations, the vendor said.

The program also supports any call-record format designated by the user and includes open-ended comment fields with word processing capabilities.

A mailing module that tracks response rates of each mailing is also included, the vendor said.

National Sales Manager's Workstation Version 3.2 costs \$995.

National Management Systems, Suite 206, 1945 Old Galveston Road, Vienna, Va. 22180. 703-827-0797.

Software Research, Inc. has announced a new version of its database management system Pastport-DBM 5.0.

The software system runs on Convergent Technologies, Inc. Ngen-based products using Convergent's CTOS operating system and on Unisys Corp. B20 and B30 systems.

Improved capabilities reportedly include extensions to the built-in programming language and automatic access into ISAM data sets through alternate key paths.

It can be used as a personal database system, a generalized report writer or a building block for systems integrators.

Pastport-DBM 5.0 is priced from \$1,200 for a package including data entry, a report writer, a data dictionary and menu modules.

Software Research, Suite 210, 1991 Crocker Road, Cleveland, Ohio 44145. 216-871-3135.

Mind Path Technologies, Inc. has begun shipments of Laser-Ready, its desktop publishing package for Hewlett-Packard Co. Laserjet printers.


The software reportedly includes more than 50 soft fonts, a spreadsheet and report utility and a laser toolbox.

The product was designed as an easy-to-learn package for producing invoices, overhead transparencies, newsletters and a variety of other documents. An IBM Personal Computer or compatible with graphics capabilities and hard disk is required.

Continued on page 57

**You want your
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to do more for
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Not too long ago, a company could get along just fine with a simple telephone system.

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With IBM's voice response unit, customers can access your computer data base with their telephone without operator assistance. They can call in and place orders or get information simply by pushing buttons on their phone.



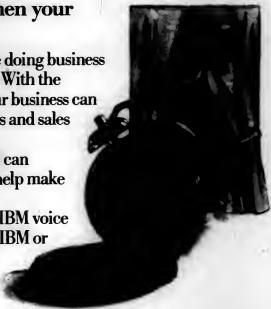
And automatic call distribution can make your operators more efficient. Incoming calls can be routed to operators who are least busy. And the number of calls can be tracked, so you can schedule shifts for peak periods.

You can even do business when your office is closed.

Today, more companies than ever are doing business around the clock, and around the world. With the PhoneMail® voice messaging system, your business can operate 24 hours a day. So your customers and sales force can reach your office at any time.

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If you'd like to hear more about how IBM voice solutions can work for you, just call your IBM or ROLM Systems Representative for a demonstration. **IBM**



"If that came out of our mainframe, I'll eat it."

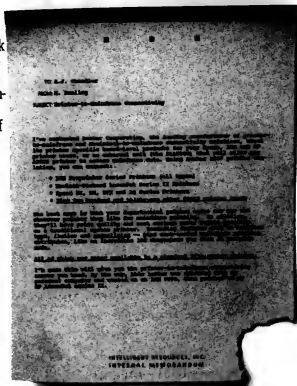
Once, the idea of getting printed mainframe information to look this good was just a little hard to swallow.

Understandable, considering the somewhat down-and-dirty nature of one of your average system printers.

A far cry, needless to say, from the advantages of ASCII printers. Whether it be the high quality, advanced capabilities and faster printing speeds of some. Or the significant cost savings of others.

Which is where Avatar's PA1500G, EP-Connect, PRO-Plus and Passport 3287 printer emulation products come in. Very simply, they make it possible for anyone in your organization who needs IBM mainframe information to get it quickly and easily using any ASCII printer. Everything from the IBM® Proprinters and the Epson series to the HP LaserJet II and everything in between.

They're easy to install, require very little training or MIS support and are fully compatible with



Now any printer can be used to print quality documents from mainframe data. Even laser printers like the one that produced this memo.

IBM 3174, 3274 and 3276 control units.

As you can imagine, the implications of all this are more than a little impressive. It means you can print mainframe data more cost efficiently than ever. It means you can print both local and mainframe applications on one printer.

But most of all, it means you can get more information into the hands of more people than you ever could before.

And because Avatar is the number one name in printer emulation technology, you can rely on getting the service, support and experience in IBM 3270 connectivity you expect.

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IBM is a registered trademark of International Business Machines Corporation. Avatar is a registered trademark of Bantec Corporation.

Continued from page 52

Laser-Ready costs \$99.95.
Mind Path Technologies, Suite 1801,
12700 Park Central Drive, Dallas, Texas
75251. 214-233-9296.

Xyquest, Inc. has incorporated optional menus in its Xywrite III Plus word processing package for IBM Personal Computers and compatible systems.

This function, named A La Carte, was designed especially for novice or casual computer users, the company said. The menu interface includes both general and context-sensitive on-screen Help facilities.

A La Carte will be a permanent feature of Xywrite III Plus, the vendor said. Current users may obtain the add-on product for \$30.

Xyquest, 44 Manning Road, Billerica, Mass. 01821. 617-671-0888.

Stairway Software, Inc. has announced an enhanced version of Screen-Extender, the company's screen manager for Micropro International Corp.'s Wordstar users.

Release 1.1 reportedly supports Wordstar Professional Releases 4 and 5 and will be available for \$59.95.

Users who purchased ScreenExtender 1.0 on or after Aug. 1 may upgrade for \$5.
Stairway Software, Suite 204, 700 Harris St., Charlottesville, Va. 22901. 804-977-7770.

Software utilities

Promark Ltd. has announced Control Panel, a software utility designed to run on IBM Personal Computers, XT's, AT's, Personal System/2s and compatible systems.

The product reportedly provides the user with five different functions, menu services, DOS services, disk services, desktop services and communications support.

Control Panel is available in three versions for single, multiuser and network configurations and is priced from \$99 to \$299.

Promark, 6207 Pan American Freeway N.E., Albuquerque, N.M. 87109. 800-321-9916.

OS/2 software

An OS/2 software program from Bolt Systems, Inc. reportedly allows users to install DOS and IBM and Microsoft Corp.'s OS/2 in their computers and then automatically boot the system of their choice.

The Multiboot utility program requires DOS 3.0 or higher and runs on IBM Personal Computer ATs, Personal System/2s and compatible systems.

The system is priced at \$49.95, plus a \$3 shipping and handling charge.

Bolt Systems, 4340 East-West Highway, Bethesda, Md. 20814. 301-656-7133.

Macintosh products

Cricket Software, Inc. has announced a second-generation version of its desktop presentation program for Apple Computer, Inc. Macintosh systems.

Cricket Presents 2.0 reportedly offers an enhanced templating function and an expanded template library. Color blends and coordinated color palettes

have been added, as well as a 220,000-word spelling checker and thesaurus.

Release 2.0 costs \$495. All registered users of Cricket Presents will receive the upgrade free of charge.

Cricket, Great Valley Corporate Center, 40 Valley Stream Pkwy., Malvern, Pa. 19355. 215-251-9890.

Magnus Corp. has announced the availability of its Magic series of software designed for Apple Computer, Inc. Macintosh computers.

The bundled series consists of File-magic, Multimagic and Window-magic. Filemagic is a startup document that will reportedly speed access to files and folders via extended Open and Save commands.

Multimagic allows the configuration of multiple sets of applications and desk accessories, and Windowmagic is said to provide user control of windowing functions.

The series is priced at \$99 and requires the Macintosh operating system 6.0.2 or higher.

Magnus, P.O. Box 744, Mukilton, Wash. 98275. 206-742-1633.

Training

Microsoft Corp. has released Learning DOS 2.0, a graphics-oriented interactive training program designed to teach both novice and intermediate users the concepts and tools of its MS-DOS.

The program has been updated to sup-

port the new commands in MS-DOS 4.0 and offers an extensive on-line quick-reference facility, according to the vendor.

Learning MS-DOS 2.0 costs \$49.95.

Microsoft, 16011 N.E. 36th Way, Box 97017, Redmond, Wash. 206-882-8080.

Peripherals

Unisys Corp. has introduced the UP1000 uninterruptible power supply for personal computers and peripherals.

The unit provides at least five minutes of battery power at full load, the vendor said. Measuring 2.3 by 15 by 14.8 in., the device weighs approximately 23 pounds.

The UP1000 costs \$995.

Unisys, P.O. Box 500, Bluebell, Pa. 19424. 800-448-1424.

ALL TERRAIN VEHICLE.



ZENITH'S BATTERY-POWERED 386 PORTABLE WORKS AS WELL ON A MOUNTAINTOP AS IT DOES ON A DESKTOP.

ZENITH data systems

Barney

CONTINUED FROM PAGE 41

blame the *Journal* or *Businessweek*. They're just doing their job and, in most cases, doing it well. You've got to blame the vendors that seem to feel customers can wait for the information that investors need right away.

Inner workings

Here's how it works. A vendor holds a Monday announcement. User-oriented publications, including *Computerworld*, are usually forced to work extra hours to scrawl up the info and attribute it to unnamed sources. Some publications get the story wrong. We check it out thoroughly

and merely risk missing a few key points. If it ain't somehow confirmed, it's pitched as a rumor.

The business pubs, on the other hand, are often spoon-fed the information and are ready to roll on announcement day or sometimes even before. This happens time and time again.

Users lose everytime this happens. CW presents the information in a way that users demand. The technology and its meaning for customers stands out in every story, except on occasions where reporters are so busy tracking down the details that they miss a lot of the meaning. The business pubs chronicle the impact on stock price and earnings per share. They chronicle what it means for the vendor.

THE business pubs are often spoon-fed the information and are ready to roll on announcement day or sometimes even before.

This not only damages users by making them wait to get the news in the form they prefer, but ultimately we end up giving short shrift to the product. Because of competitive pressures, once the story is out, its news value diminishes. It may still be important, but it will get buried in the back pages and run shorter. What users think, and what the thing does, will simply not be as fleshed out.

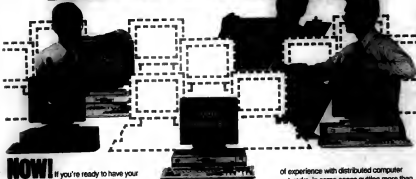
So remember. Anytime you read an article in the *Journal* that has the ven-

дор's official blessing and read about the same subject in CW quoting anonymous sources, that vendor is saying something that should be very disturbing. It is saying that you do not matter.

Someday, vendors may smarten up and remember that your dollars count a lot more than those of shareholders. Just don't hold your breath.

Barney is a *Computerworld* senior editor, micro-computing.

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Voice-drive line aids disabled

BY MICHAEL ALEXANDER
CW STAFF

ST. LOUIS — Heath/Zenith Educational Systems introduced its Pro Voice Command 1 vocational workstation at the 1986 American Vocational Association Show last week.

The revolutionary system was originally designed for people with severe upper-body limitations and is intended to enable its user to perform a wide variety of tasks, including manipulating a robotic arm by voice command.

The voice-activated workstation,



Probs allows voice work for disabled

which will cost about \$49,000, consists of a Zenith personal computer, a specially designed keyboard, a Pro Command soft-drive robot, a Hewlett-Packard Co. Laserjet printer, a telephone management system and a work cell enclosure with special shelves, work surface and wiring. It also has proprietary hardware and software to change speech into electronic signals and motion control.

The end user can operate the PC, the telephone management system and the personal robotic arm—which can do such tasks as picking up heavy books and inserting floppy disks into drives—using simple vocal commands.

Heath/Zenith is exploring other uses for the system, said Doug Bosham, director of educational marketing and development at Heath/Zenith Educational Systems. Potential applications include teaching voice-control technology in computer centers or robotic labs; computer-aided instruction; data input or control; and voice-controlled security.

Postures

CONTINUED FROM PAGE 41

Six months ago, Arthur Young & Co. in San Jose, Calif., found that its network of Apple Computer, Inc. Macintosh computers had been infected by a virus that entered the system through a shareware program. The rogue program did not damage programs or files on the network, but it consumed memory on the Macintoshes until they could barely function.

"It was a real hassle," said Chris Veal, a partner and western regional director of technical development at Arthur Young. "We had to run a vaccine program and tell people who had offloaded information onto floppies to bring them in so that we could check them out."

But several MIS managers who oversee PC networks said that ultimately, there is little they can do to stop a determined assailant from injecting a virus into their networks.

The best defense is a combination of prevention and detection, Veal said. "We periodically run antivirus software that checks everyone's computer and makes sure the system is clean," he said. "But if you start talking too much about how secure your system is, it throws out the challenge to someone to try to get in."

"Your biggest Achilles' heel is the disgruntled employee who wants to put a virus into your system," said MIS Director Bard White at Spaulding Worldwide Sports in Chicopee, Mass. The firm spent nearly a year designing a plan to protect

its systems from infection by viruses.

"We have gone to three different levels of protection," White explained. "In the first level, we installed antivirus software on all 120 of our PCs." All of the PCs are connected to a mainframe, and about one-third are linked to each other.

Routine auditing

The second and third levels of protection are founded on software that limits access to the company's mainframe and that routinely audits the files and programs on the mainframe to see whether they have been improperly altered.

Last month, National LAN Laboratory, a trade group representing LAN hardware and software vendors based in Reston, Va., issued a set of security

guidelines on computer viruses and system reliability that has been endorsed by more than 60 vendors.

There are several elements to inoculating a LAN against contamination from a computer virus, according to Del Jones, general manager of the trade group. A security plan should include a provision that imposes a quarantine on new applications and requires that end users first run the applications on an isolated PC before putting them on the LAN, Jones said. Shareware and freeware should be viewed with "critical skepticism" and should undergo a longer quarantine period than packaged software, he added.

The LAN group recommended other steps:

- Making backups of original software and

storing them off site.

- Copying system software and data at least once a month.

- Regularly checking programs on a system for evidence of tampering or unexplained changes.
- Planning for quick removal of any program from the network that is suspected of being contaminated and for backing up data.

"The LAN group does not endorse the use of vaccine programs primarily because they lead to a false sense of security and do not offer much protection against viruses," Jones said. The group also fears that some unscrupulous individuals or firms may be tempted to stimulate demand for their vaccine programs by first unleashing a virus and then selling a cure.

Focal Point gets sharpened

Mediagenic's Focal Point has been enhanced with 50 features designed to help harried executives better plan their daily activities and organize their work.

The original Focal Point II, a personal information manager for time and schedule management, is one of the best selling stacks for Apple Computer, Inc.'s Hypercard, which runs on the Macintosh family of computers.

Focal Point II, the latest release from Menlo Park, Calif.-based Mediagenic, has been upgraded to include network support, task and project management, a report generator and communications capabilities.

The essential features of the original version — daily appointment book, to-do list and monthly calendar — have also been enhanced. The program reportedly enables end users to keep track of recurring appointments quickly and easily by simply indicating the time of the appointment and how regularly it occurs. Focal Point II is also said to permit users to set an alarm to remind them of an appointment — even while working in another application in or out of Hypercard — and speed-dial frequently used telephone numbers.

Focal Point II requires an Apple Macintosh Plus, SE or II with 1M byte of random-access memory and a hard disk drive. The program also requires Apple's Hypercard Version 1.2, which is included, or higher. It has a suggested retail price of approximately \$200; current owners can upgrade for \$40 until Jan. 31 and for \$90 thereafter.



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NETWORKING

DATA STREAM

John R. Purvis

Thanks for the modems

Modems, those humble yet useful little communications devices, have done a pretty good job of keeping up with the evolving communications needs of workstation users — which is more than can be said for communications software. Before we get into that, a brief modern history seems called for.

The most fundamental difference in modern design lies in the choice of asynchronous or synchronous technology. Asynchronous communications has its roots in the old, slow, start/stop-type terminals, such as the teletypewriter, used in the early days of computing.

Because of the hasty nature of these early interface devices, start-bits and stop-bits were necessary to distinguish the beginning of each character being transmitted. Thus, for every character of data to be transmitted, three to four overhead bits were sent, for an efficiency rate of 70% — only 64% if two stop-bits were used.

Synchronous modems were designed for higher speed devices that would not require the handling of gaps between data characters. These devices transmit a stream of eight-bit characters without the overhead of start/stop bits.

Both asynchronous and synchronous modems have picked up speed and gone down in price in the last few years — that new both types of devices can support 9.6K bit/sec. over dial-up lines at a cost of

Continued on page 66

Factory analysis easy as 1-2-3

Lotus-GM interface collects, calculates, charts data for MAP networks

BY ELISABETH HORWITT
CW STAFF

WARREN, Mich. — Manufacturing firms may be able to use Lotus Development Corp.'s 1-2-3 commands for analysis of shop floor data if a Manufacturing Automation Protocol (MAP) interface for the product becomes commercially available.

General Motors Corp. and Lotus jointly announced a prototype version of 1-2-3MAP at the auto giant's quarterly Implementers' Forum, held here recently. The 1-2-3 add-on, which Lotus is developing under contract to GM, enables the software package to communicate with "anything on a MAP network," according to Matt Suffoletto, a product manager at Lotus Industrial Marketing Group.

The 1-2-3MAP will enable users to graph and analyze data at a local workstation and then communicate it to supervisory and office systems using the fa-

miliar 1-2-3 commands, said Bruce Richardson, vice-president of Advanced Manufacturing Research, Inc. in Cambridge, Mass.

For example, during a demonstration of a 1-2-3MAP prototype at the Forum, a Compaq Computer Corp. personal computer, dubbed Factory PC, collected process control data in Lotus' Symphony spreadsheet. It then calculated and charted the data and transferred the results over a MAP network to a second Compaq PC, dubbed Office PC. Also demonstrated was a link to Lotus' Agenda package

for categorizing data.

"Lotus is sitting on top of a gold mine," Richardson said. The 1-2-3MAP will appeal to both users and cell control and shop floor vendors that want to develop applications for collecting, presenting and analyzing shop floor data, he said.

With 1-2-3MAP, it will be possible to present the data graphically, analyze it in rows and columns and load it into a materials resource planning system for real-time scheduling and adjustments, Richardson said.

The 1-2-3MAP could give the networking standard a big boost among users, since up until now, there have been few useful applications for MAP, Richardson said.

Lotus has not yet decided whether or not to make 1-2-3MAP into a commercial product, a company spokeswoman said.

The final GM product is scheduled to ship in early March.

times within two months.

In order to cope with this forced gypsy lifestyle, the medical center selected a broadband LAN configuration from Mountain View, Calif.-based Sytek, Inc. that places a backbone coaxial cable in the ceiling and provides taps every 50 feet. Moving a workstation requires installing a new drop of 35 to 45 feet of coaxial cable from the ceiling tap to the workstation at a cost of roughly \$100 for cable, Dutky said.

Conversely, running several hundred feet of twisted-pair wiring from each workstation to the computer room would have cost an average of about \$700, he said, depending on the distance.

Continued on page 64

Medical center finds savings with broadband

BY MATH BETTS
CW STAFF

WASHINGTON, D.C. — The Georgetown University Medical Center figures it is saving an average of \$600 every time a workstation is moved, thanks to a pair of new local-area networks. What is more, the savings are adding up fast as the center staff can play musical chairs because of various construction projects.

In essence, the LANs gave

the medical center a cost-effective way to cope with expansion and construction projects without disrupting communications, according to Steven Dutky, director of integration and development in the hospital's Information Systems unit.

Dutky estimated that between 12% and 25% of the center's staff was forced to make a move last year, thanks to continual renovations on five buildings and the construction of a sixth. One user had to be moved three

Freed Bells ready network services

BY ELISABETH HORWITT
CW STAFF

Taking advantage of relaxing regulatory restrictions, several Bell operating and regional holding companies are readying enhanced networking services for next year.

In response to Judge Harold Greene's March ruling that they could offer information services, several organizations are readying programs that will link users on IBM Personal Computers and terminals with commercial in-

formation services.

US West announced an information gateway that is said to provide users of terminals and IBM PCs with access to a variety of information services, including local shopping, calendar and ticket-ordering services, as well as national information databases, the company said.

The gateway will also provide access to international information services through an agreement between US West and New York-based videotex company Minnet USA. Other companies

that will help information providers interface with US West's gateway include U.S. Videotex in Houston and AYS Gateway Services, Inc. in Boston.

The regional holding company initially plans to offer the service in the Omaha area next fall, moving into other areas at a later date, a spokesman said.

New England Telephone & Telegraph Co. is slated to introduce its own information gateway service today in Burlington, Vt., a company spokesman said. The company expects to extend

the offering to Eastern Massachusetts in the first quarter of next year, he added.

Nynex Corp., Southwestern Bell Telephone Co. and Bell Atlantic Corp. plan to initiate information gateway service later over the next few months, said Globenet, Inc., an Alexandria, Va.-based carrier that will be providing interexchange services for several of these trials.

Linking the country Globenet will provide links between the Bell operating companies' gateways and information providers around the country, since the local carriers are still

OS/2 server mix-'n'-match may not work

BY PATRICIA KEEFE
CW STAFF

By now, most local-area network users know that officials from Microsoft Corp., 3Com Corp. and IBM, albeit somewhat unofficially, have confirmed that OS/2 file server software from IBM and Microsoft are basically compatible — with a few exceptions [CW, Dec. 5].

How notable those exceptions are depends on who you are and what you want to do.

At Comdex/Fall this year, IBM's Lee Reinweig, director of software strategy at IBM's Entry Systems Division, told the press that IBM's OS/2 Standard Edition 1.1 would support 3Com and Microsoft's LAN Manager Named Pipes application programming interface. This extends to applications that write to Named Pipes — which most of the announced LAN Manager applications do.

Continued on page 65

Data View

LAN forecast bright
Worldwide installed base of all
PC and Macintosh networks



SOURCE: DATAQUEST, INC.

barred from offering services outside their regions, the vendor said.

On another front, Pacific Bell announced that it plans to offer a nationwide service throughout California by 1990. The company will initially target its medium-size-to-large business customers. Trials targeting small businesses and residential markets are planned for next spring in Maryland and San Pedro, Calif., Pacific Bell said.

Customers will be charged either a flat rate or according to usage, depending on the number of mailboxes they use, the carrier said.



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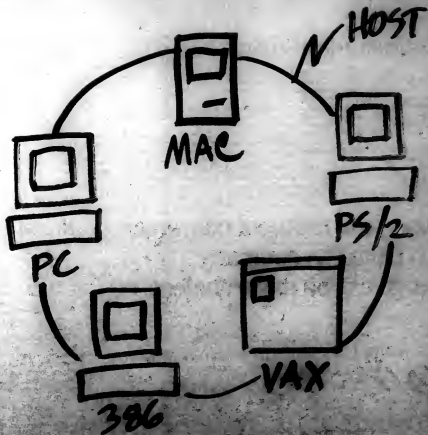
While this variety of solutions makes it easy for users to meet their needs, it presents some problems. Like sharing information between incompatible systems. The kinds of problems facing more and more companies as their information systems grow and diversify.

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BIT BLAST

Prime, Dialcom in joint effort

Prime Computer, Inc. and British Telecom International's Dialcom, Inc. subsidiary have joined in a cooperative effort to develop, market and support communications systems for electronic messaging and information systems. The first phase will involve joint marketing of Dialcom's Pathfinder system on 50 series superminicomputers from Prime.

Phase II covers joint development of a gateway to allow Prime users to access Dialcom's value-added network services. It will complement Prime's X-400-based family of electronic-mail products, now under development.

Micom Systems, Inc. and Hewlett-Packard Co. have signed an agreement to provide joint network support for installations that have both Microm data switches and HP computer and communications equipment. This should make it easier to troubleshoot and expedite resolution of network problems, a Microm spokesman said. HP holds a similar pact with Northern Telecom, Inc.

Ardent Computer Corp. and Network Computing Devices, Inc. (NCD) have a joint marketing agreement under which Ardent will reference-sell and selectively

direct-sell NCD's forthcoming X Window network display station for its Titan supercomputer. The NCD16 Network Display Station will be marketed primarily as a front end for the computational server version of the recently announced Titan.

Contel Customer Support will become a value-added reseller of Syntex, Inc. and Proteon, Inc. equipment.

Infotron Systems Corp. is the latest networking vendor to promise support for AT&T's Unified Network Management Architecture platform, which reportedly conforms to the Open Systems Interconnect standard. Infotron said it will interface its own network management systems with AT&T's.

The North American MAP/TOF Users Group has released documentation for Manufacturing Automation Protocol and Technical Office Protocol versions 3.0. The specifications are sold as a set costing \$300, \$200 for group members. For information, call 313-271-1500.

AT&T has joined 11 communications firms in an agreement to build the first undersea fiber-optic cable connection between the U.S. mainland and Puerto Rico, the Dominican Republic, Jamaica and Colombia. The 2,430-mile trans-Caribbean cable system, to be completed by 1990, will form one segment of a worldwide fiber-optic backbone that includes trans-Atlantic and trans-Pacific links. AT&T will own 48% of the bandwidth.

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KMW also manufactures protocol converters for use with IBM System 34/36/38 computers. KMW's Twinnax converter lets you make the most of your System/3X, by allowing communication with ASCII printers, CRTs, PCs, and Macintoshes.

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Medical center

CONTINUED FROM PAGE 61

Dutky explained that the center picked coaxial for three reasons:

- The existing twisted-pair wiring, used for telephones and dictation machines, dates back to the 1930s, is in poor shape and was not systematically upgraded. Consequently, efficient computer networking would have required a costly, complete rewiring job.
- The coaxial backbone network is more compact and requires less closet space than twisted-pair wiring.
- The center wanted broadband's wide bandwidth on coaxial cable to support as many as 40 channels of video communications for future training and medical-imaging applications.

The medical center uses Sytek's Localnet 2000 for asynchronous terminal-to-host connections; applications run on five Data General MV/8000 minicomputers and an IBM 4381.

It matches up

Dutky said he favored Sytek's Localnet 2000 technology over competing products because it provides a high degree of configurability from the host minicomputer. For example, the host can identify individual terminals and control their access to the host files, he said.

Sytek's Localnet 6000 product line is used for a second LAN that has five file servers and links about 100 personal computers in the hospital and cancer center. The broadband network handles a variety of clinical applications such as patient registration and lab reports along with administrative services such as accounts payable and purchase orders.

An important side benefit of the two LANs is that they reduce the number of minicomputer ports that must be dedicated to end-user devices because idle users are connected to the LANs but not to the hosts, Dutky said. Installing the LANs, which cut the number of ports from 192 per host to 60, eventually will allow the center to consolidate the number of host processors, he added.

"We did have a main trunk running through an area that was going to be renovated, so we had to run serial cable with a splice, and we had to mark it very explicitly so the workmen wouldn't demolish it," Dutky recalled. "That's one problem with half-inch coaxial cable — it looks solid, like a conduit, and there's a tendency for workmen to want to grab hold of it, thinking it will hold their weight." Dutky added.

Delays may hurt Timeplex lead

BY ELISABETH NORWITT
CW STAFF

WOODCLIFF LAKE, N.J. — Projected shipping delays of eight or nine months on two key networking products are threatening Timeplex, Inc.'s already precarious position as the No. 1 T1 switch vendor, an industry source said.

Timeplex recently announced delayed availability for Link/100, a high-end T1 multiplexer said to support up to 144 T1 circuits, and the Timeview network management system.

Both products were originally scheduled for shipment last October. Link/100 is now slated to become available in June or July of next year, according to Timeplex. Timeview will be released in two in-

stallments: the less sophisticated Timeview 2000 in the second quarter of 1989; and the "larger, more complex" Timeview 4000 by the end of next year.

Timeplex' inability to field a high-end T1 multiplexer could turn away potential customers, according to Mara Novak, program director of the Enterprise Network Strategies division at the Gartner Group, Inc. "I don't think they are even putting Link/100 in contract bids right now," she said.

According to Gartner, while the firm is still in a strong position, with 38% of the market in 1987 and a projected 36% share this year, it is losing ground to competitors such as Network Equipment Technologies, Inc. and Digital Communications Associates, Inc., both of which

have high-end T1 multiplexers shipping now. Timeplex could lose another point or two in 1989, particularly if it is unable to convince customers that it will come through on Link/100, Novak said.

Timeplex had originally planned to ship the U.S. version of Link/100 in October and an international version at a later date. However, product testing for the U.S. version took so much time that Timeplex decided to take the extra time to get both versions tested and released simultaneously, company spokesman David Woodall said.

Gartner's Novak was skeptical that Timeplex is willingly holding up its U.S. product to wait for an international release "because they're really getting killed in the U.S."

Timeplex held off shipping Timeview because it had to go back and develop a "more advanced user interface" that

would be "simple to use and modeled the way people intuitively think about network diagnostics," Woodall said.

Timeplex' announced strategy of opening up Timeview to other vendors' products, through an Open Systems Interconnect-compliant interface, also seems to be suffering from delay.

The vendor plans to make interface specifications available to selected vendors around the time that Timeview 4000 is released, Woodall said. "No point in lining up people to support a product that isn't available," he said. Timeplex has not yet decided whether it will make the interface generally available, he added.

Novak said that Timeplex's merger with Unisys Corp. may be at least partially responsible for the Timeview put-off, possibly because the parent company wants its products to be integrated into the network management system.

OS/2 server

CONTINUED FROM PAGE 61

All of this makes sense, since LAN Server incorporates LAN Manager code. But an IBM is wont to do, it figured it could build a better mousetrap. So it has tinkered somewhat with LAN Manager code, and the end result is differences that do not entirely portend smooth sailing.

Some of these changes relate to IBM's need to accommodate its single-system approach to network management, which sees all file servers as one entity.

These differences will likely pose a greater headache for network administrators in a mixed environment than software developers.

Even so, "customers will be able to mix-and-match LAN Manager and LAN Server networking products just as they today mix-and-match personal computers" from third parties and IBM, according to a Microsoft white paper on interoperability between the two servers.

IBM has made no such claim, but user interest in the following areas will determine their level of comfort with Microsoft's posture: security, full-screen inter-

face programs and printer spoolers.

"These variations do not preclude interoperability. They simply involve a little extra administrative overhead," the Microsoft report said.

Whether users believe that or not, what follows is a breakdown of the differences, according to Microsoft.

LAN Manager and LAN Server use different security systems for specifying, storing and authorizing network access permissions.

This has two immediate impacts. First, "a few simple" steps must be taken in order to administrate security on mixed

LANs. So user accounts, for example, must be set up on both servers so that users can access resources on both systems.

Second, the security system differences place some limits on the commands that may be issued to a server of the opposite type.

Both servers include full-screen interface programs for issuing network commands. Though visually similar, the programs are different.

As a result, they are "somewhat limited" in what kinds of network operations they are able to perform on the opposite screen.

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Purvis

FROM PAGE 61

approximately \$1,000 per modem.

This evolution responded to clear market demand, as dumb terminals gave way to IBM PCs with local processing and storage facilities. A speed of 300 bit/sec., while adequate for send-

ing keystrokes from a terminal, was too slow for file transfer.

Speed is just one aspect of modems that has changed to meet the market. Another is standardized protocols to ensure that different vendors' devices can communicate.

In the last few years, the Consultative Committee on International Telephony and Telegraphy (CCITT) has come up

with standards and recommendations covering the gamut of modem-based communications.

Some manufacturers have reduced costs or squeezed additional bandwidth out of modems by building asymmetrical modems. These provide a data path in one direction at a rated speed of roughly 4.8K bit/sec. but only a small fraction of that

speed in the reverse direction.

This may well be a useful way to use available bandwidth — at least for some applications, such as terminal-to-host communications, that do not require high-speed transmission in both directions at once. However, asymmetrical devices add confusion to the marketplace because they lie outside the domain of the existing symmetric

standards that provide transfer at 1,200 to 9.6K bit/sec. in each direction, in either a half-duplex or full-duplex mode.

For example, the CCITT developed V.32, a standard that uses Trellis encoding to provide reliable synchronous or asynchronous communications over 9.6K bit/sec. dial-up links. However, a few modem vendors have been pushing an alternate, asynchronous standard, delaying the time when users can count on multivendor interoperability at that speed.

Of course, effective standardization must include software as well as hardware. While there are many proprietary and public-domain protocols for file transfer, no established standard exists that defines this process.

Out of sync
In the asynchronous world, the most widely used protocol seems to be Kermit, which offers the advantages of low user cost and availability on a wide variety of computers.

However, not all versions and implementations of Kermit are compatible. While some versions support data rates up to 19.2K bit/sec., most of the asynchronous communications tools, written with 1,200 and 2,400 bit/sec. modems in mind, often slow the newer 9.6K bit/sec. modems down to the 2,400 to 4.8K bit/sec. range.

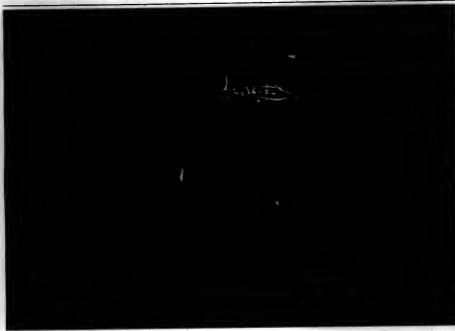
In the synchronous world, while there is no official standard, IBM set a de facto standard with its 3780 Binary Synchronous Communication protocol. While this is a complex protocol, it is well documented, available for just about any computer and efficiently uses full 9.6K bit/sec. modem speeds.

Playing catch-up
In the meantime, communications software still needs to catch up with hardware capabilities. For example, software will have to be revised to take advantage of Integrated Services Digital Network's (ISDN) 64K bit/sec. channels and high-performance hardware.

The send-a-packet/acknowledge-receipt protocols popular for asynchronous communications, such as Kermit and Xmodem, are highly inefficient for ISDN. The standard's 16K bit/sec. packet-switched D channel can yield less than 3K bit/sec. throughput because of the packetization overhead.

Are we lost forever in the quagmire? No, the day will come when the software catches up with the hardware. In the meantime, the best solution for transferring files at high speed over dial-up lines seems to be the venerable 3780 protocol.

Purvis is an assistant professor of computer science at Saint Edward's University in Austin, Texas.



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NEW PRODUCTS

Local-area networking software

Cactus Computer, Inc. has announced a product that reportedly allows up to 65,025 Apple Computer, Inc. Macintosh II machines to communicate over Ethernet or broadband cabling.

The Logical Zone Software installs in any Macintosh II system and is divided into 255 separate logical zones that incorporate up to 255 nodes per zone, the vendor said.

The software costs \$95 per computer and operates with Apple's EtherTalk

Board or Cactus' Broadtalk Adapter Board.

Cactus, 1120 Metrocrest Drive, Carrollton, Texas 75006. 214-416-0525.

Corvus Systems, Inc. has introduced an enhanced version of its distributed local-area networking operating system software.

According to the company, PC/NOS 2.0 was designed for industry-standard hardware platforms and offers support for an unlimited number of nodes. The product also provides IBM Netbios emulation to accommodate IBM Systems Network Architecture or CCITT X.25 gateways.

PC/NOS 2.0 is priced at \$695 and reportedly runs on IBM Personal Computers, Personal System/2s and compatible systems, as well as on Apple Computer, Inc. Macintosh and Apple II machines.

Corvus, 160 Great Oaks Blvd., San Jose, Calif. 95119. 408-281-4100.

Syntrex, Inc. has introduced a document management system that was designed to operate within the Banyan Systems, Inc. Virtual Networking Software-based network environment.

The Designated Document Manager software package reportedly allows users to store and locate documents and spreadsheets by logical, user-defined descriptive criteria, as opposed to DOS file names.

The base system is priced at \$995 per network server.

Syntrex, 246 Industrial Way W., Easton, N.J. 07724. 800-526-2829.

Links

Barr Systems, Inc. has enhanced its Barr/SNA RJE package to permit communications at 128K bit/sec. with two direct-memory access channels.

The product was designed to transform an IBM Personal Computer or compatible system into an remote job entry workstation to communicate with a mainframe.

Barr/SNA RJE costs \$1,590. Barr Systems, Building M, 2830 N.W. 41st St., Gainesville, Fla. 32606. 800-227-7797.

A micro-to-mainframe software link designed specifically for Apple Computer, Inc.'s line of Macintosh computers has been announced by Cambridge Computer Corp.

Called the Mac73/78, the product reportedly emulates the Honeywell Bull, Inc. VIP 7200/7300/7600 and HDS series of asynchronous terminals and can be used to connect the Macintosh machines to any Honeywell Bull host system.

Mac73/78 costs \$295. Cambridge Computer, 80 Mt. Sanford Road, Mt. Carmel, Conn. 06518. 203-288-6004.

Winterhalter, Inc. has expanded its line of Data Talker products with the Data Talker 3270 U/I/X and the Data Talker 3780 U/I/X.

According to the vendor, the board-level products were designed to allow IBM Personal Computers running the Unix or Xenix operating system to communicate asynchronously by IBM 3270 Binary Systems Communications (BSC) or Systems Network Architecture (SNA) protocols.

The Data Talker 3270 U/I/X can be configured with an Intel Corp. 8088 or 80186 processor with 256K bytes of memory, a synchronous port and up to eight asynchronous ports. It is priced from \$2,195.

The Data Talker 3780 U/I/X features a proprietary Batch Command Language and is priced from \$1,195.

Winterhalter, 3796 Plaza Drive, Ann Arbor, Mich. 48106. 313-662-2002.

Interlan, Inc. has announced a dual-protocol terminal server that supports Digital Equipment Corp.'s LAT protocol and Interlan's Version 3.0 of Transmission Control Protocol/Internet Protocol (TCP/IP).

The NTS300 LAT/TCP reportedly supports up to 64 virtual circuits per server. It costs \$2,750.

Interlan, 155 Swanson Road, Bonboro, Mass. 01710. 508-263-9929.

Modems/Multiplexers

A 1,200 and 300 bit/sec. asynchronous modem has been announced by Goldstar Technology, Inc.

The GSM1200 operates in half- or full-duplex modes at 1,200 bit/sec. and will automatically accommodate the speed of incoming data transmission, according to the vendor. It is Hayes Microcomputer Products, Inc. compatible.

The GSM1200 costs \$119.

Goldstar, 1130 E. Arroyo Ave., Sunnyvale, Calif. 94086. 408-737-8873.



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STD 1600s transfer data at speeds up to 56KB. Double-buffering eliminates delays caused by read/write cycle times.

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STD 1600 options:

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- Code conversion
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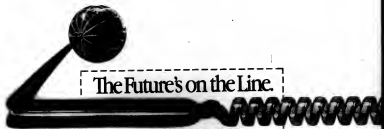
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EXECUTIVE REPORT

ISDN

Even users who see promise are still troubled by questions

BY MICHAEL HURWICZ

Some corporations, such as Houston-based Tenneco Corp., look at the emerging shape of ISDN and see opportunity beckoning. Others, like Chevron Information Technology Co. (CITC) in San Ramon, Calif., gaze in the same direction and see an interesting idea surrounded by a mass of unanswered questions.

Tenneco, which switched more than 2,200 — almost half — of its Houston lines to Integrated Services Digital Network (ISDN) in June, is a contender for the distinction of being the largest ISDN user in the country.

On the other hand, although CITC is participating in ISDN trials with Pacific Bell and Northern Telecom, Inc., it has no plans to implement ISDN on a regular basis and expresses doubt about whether the advantages to be derived from the scheme are sufficient to justify a conversion.

ISDN, an international standard for transmission of data and digitized voice over phone lines, currently comes in two flavors: Basic Rate Interface and Primary Rate Interface. Basic Rate ISDN was designed to service a single desk top. It offers two digital circuits, referred to as the B channels; each circuit is capable of carrying 64K bit/sec. of digital information, whether data or voice. A third 16K bit/sec. channel — the D, or signaling, channel — is used to transmit control information, such as the phone number of the calling party.

In the U.S., Primary Rate ISDN offers 1.5M bit/sec. of bandwidth, equivalent to a T1 circuit. That bandwidth is divided into 23 B channels and one D channel, each with the same characteristics as the equivalent Basic Rate channel. Primary Rate ISDN was designed to be used the same ways T1 circuits are currently used — to carry

Hurwicz is president of the I&T Group, a data communications consulting firm in Nashville.



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multiple data and voice channels between private branch exchanges (PBX) or central office switches and, less frequently, to serve as a single high-speed data channel for applications requiring that kind of throughput.

Although no single characteristic of ISDN makes it obviously superior to anything else around, the technology offers a number of incremental improvements over other digital transmission technologies. Together, these

improvements make ISDN interesting to many users.

For instance, ISDN allows users to combine voice and data networks, thus lowering management and maintenance costs. It can also support special services such as "bandwidth on demand," in which users can program the central office switch and change lines, say, from 800 in-WATS to switched 56K bit/sec. and back again, at will.

One factor that can make a

great deal of difference is the way an organization sees ISDN in the technology the firm is currently using for its networks.

ISDN offers a much more compelling prospect for a Centrex-based organization like Tenneco than it does for one like CITC, with its significant investment in PBX technology.

Most ISDN offerings are currently packaged as Centrex-like services, which means customers with PBX-based networks would have to give up their PBXs in order to make a full commitment to ISDN at this time. Also, PBX vendors currently do not support the Basic Rate Interface, which would allow users to bring ISDN to their desk tops.

In addition, ISDN features are now usually available only when users are making calls within an area served by a single central office. This setup is often acceptable to the Centrex user, who frequently hooks up numerous desk tops through a single central office. It is less likely to appeal to PBX users, who may be interested in connecting more widely scattered PBXs.

What these users would need to see is tariffed service from the local carrier to the long-distance carrier offering interexchange Primary Rate connections. Such links would allow connections between PBXs with ISDN — at a price comparable with current T1 technology.

Russell Roy, manager of the telecommunications services department at Tenneco, says his company compared ISDN with its existing Centrex service and various PBX-based solutions. Its selection of a central office-based ISDN offering was made purely on the basis of economics and features.

Implementing a PBX-based system at Tenneco would have meant buying and installing several PBXs for the firm's widely scattered buildings in Houston, Roy notes. Taking into account maintenance, personnel and space and power facilities requirements for the PBXs, as well as the necessity of providing local-area networking between buildings, Tenneco determined



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little or no compatibility.

For one northeast college, AT&T Network Systems, working with the local telephone company, demonstrated that ISDN was the solution. Their information services manager explained: "ISDN gave us the best capabilities for the least cost. And we didn't have to trash our existing systems."

With central office-based ISDN, ordinary phone lines become the links in a fully interactive network. This translates into many applications and benefits. Voice and data can be transmitted simultaneously. For example, students and professors can confer with the Dean, who has on-line access to student records. Electronic mail streamlines internal communication, so course enrollment changes can be posted immediately. PC/terminal access to host computers and electronic file transfer extend every user's access to sophisticated software and multiple databases.

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Questions

CONTINUED FROM PAGE 69

that the central office-based ISDN was a more economic approach. The fact that it happened to be ISDN was "just the icing," Roy says.

Although the features were not what sold Tencoco on ISDN, the company has discovered that some of the extras are very useful.

For example, Roy notes that ISDN permits a single-line phone to emulate a multiline phone, allowing a user to have one person on hold, one person on the line and simultaneously take a third call or hook up on-line with a host computer or dial-up services.

Another feature of Tencoco's central office-based ISDN is keypad-accessed directory service. According to Roy, this reduces the size of the local directory and the number of people calling the operator to get a number.

Tencoco has also integrated voice messaging with its ISDN system. The ISDN service offers several advantages over typical Centrex in this application. ISDN users communicate with the central office switch directly over the D channel to control their own voice-messaging features, such as the conditions under which calls will be routed to the voice messaging system. With Centrex, such changes had to be made by central office personnel.

Instant info

The D channel offers many possibilities. For example, when a prospect calls the marketing department, a personal computer could get the caller's number from the D channel and, based on that number, bring up the name and account information from a database so the salesperson could have that information immediately.

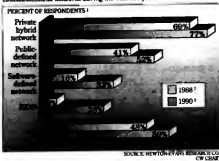
CITC is approaching the ISDN evaluation process from a direction that is al-

most exactly the opposite of Tencoco's. Although the organization is attracted to some of the features of ISDN, a central office solution is not appropriate for its current PBX installations.

Steve White, supervisor of communications and workstations in the company's planning and technology department, sees a number of potential advantages for PBX-based ISDN, particularly in the area of terminal connectivity. Today, Chevron typically provides terminal connectivity via leased lines.

Making headway

ISDN is expected to show a larger increase than other types of communications networks during the next two years



"We would like to leverage our investment in the voice network by moving some of the data connectivity onto the voice network," White says.

One motivation for integrating data and voice, he points out, is to simplify moves and changes for terminals.

"If we could unplug a terminal from an office, walk down the hall and plug it back in, we could save money by avoiding having to send a technician out to punch down a lot of wires — which is the way data moves are currently handled," White notes.

ISDN simplifies moves and changes for two reasons: First, it provides switched, rather than dedicated, point-to-point service. Instead of having to rewire in order to move a terminal, one reprograms the switch — at worst. At best, the ISDN equipment tells the switch about the

move, and the change is made automatically or even on an ad hoc basis.

Second, each of the B channels can be used for either voice or data at any given time. The change between voice and data is made in software at the switch and can be requested on an ad hoc basis by the terminal equipment via the D channel. Thus a single B channel can conveniently alternate between voice and data, and a pair of B channels can be used for voice and data at the same time.

As a result of these two characteristics, a line that is being used for a phone today may be used for a data terminal tomorrow, without rewiring — and without giving up the voice line.

Today, Chevron cannot do this, White notes, because each terminal, or PC emulating a terminal, is hard-wired to a cluster controller, which, in turn, connects via leased lines to a remote communications controller and then on to the data center, also via leased lines.

With ISDN, terminals would connect directly to a PBX, just as phones do. Cluster controllers might be at the data center or collocated with the PBX. In either case, connections from terminals to cluster controllers would be managed by the PBX, eliminating the need to rewire when terminals are moved.

Getting the lead out

Another possible use for ISDN at Chevron, White says, is for point of sale (POS) terminals in service stations. Currently, POS terminals in Chevron service stations use leased lines to connect to the data center. "With ISDN," White points out, "I think we could get rid of all those leased lines and use Signaling System Seven (SS7) to set up data calls over switched ISDN lines."

Call setup is so fast with SS7, he says, that response times for circuit-switched ISDN calls would be similar to those on today's leased lines. Presumably, occasional dial-up connections from POS terminals would be less expensive than leased-line connections that are provided 24 hours a day, even though they may only be used sporadically.

The fact that Pacific Bell is offering ISDN as a Centrex service is, however, a major impediment as far as CITC is concerned.

"We are a PBX-based company," White points out. "We do not use Centrex. And we don't see giving up our PBX base just to get ISDN features."

Chevron — if it were to use ISDN at all — would provide Basic Rate ISDN to desk tops from its own PBXs and lease Primary Rate ISDN lines to connect PBXs at various locations, White says. That is the architecture the company is now evaluating in the trial with Northern Telecom. Pacific Bell is providing 50 Basic Rate ISDN lines from a Northern Telecom DMS-100 CO switch.

The ISDN lines, White says, are being used mainly to replace private lines connecting terminals and PCs to host computers located in four separate buildings. Chevron currently has two nationwide private-line networks, one for data and

Cost is the key

BY BRUCE PAGE

Many firms find it hard to think about ISDN as a real possibility while the cost column still has so many thorns. It is surely impossible, managers contend, to plan for ISDN when prices in the two main expense areas related to it — equipment and the actual communications tariffs — are still so "uncertain." "There has been no formal pricing studies put out" by the International Telecommunications Union, says Gary Sorenson, manager of network operations at Southern Bell in Seattle. "So there's no way I can put down an ISDN budget for my company. Possibly by 1991, I might have some idea."

Furthermore, the cost of ISDN is not the only factor that is attached to considering ISDN. "We have to consider the cost of the equipment, the cost of the service, the cost of the training, the cost of the support, the cost of the maintenance, the cost of the upgrade, the cost of the replacement, the cost of the disposal," says Sorenson. "It's a lot of things to think about."

But the cost of ISDN is still the key. "If the cost of ISDN is too high, we won't use it," says Sorenson. "If the cost of ISDN is low enough, we will use it. It's that simple."

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one for voice.

The other trial, with Northern Telecom, is testing connections between two Northern Telecom SL-1 PBXs using Primary Rate ISDN. White has no comment on the status of that trial except to say, "It's moving along." He does note that Northern Telecom has similar customers working at other customer sites. As with the Pacific Bell site, he notes, "It is up and working."

"We will wait and see how it works, and then make plans," he explains, noting that he does not expect to have gathered enough information for at least a year.

ISDN might be an easier sell with PBX users like Chevron if PBX vendors supported ISDN. They would also like to see interexchange Primary Rate ISDN service made available locally. According to Tom Nolle, president of CIMI Corp. in Haddonfield, N.J., a technology assessment company that has studied ISDN for four years, this type of service should become available around the second quarter of 1989 and will continue to become more widely available throughout the rest of next year.

Still, even if the issue of Primary Rate interexchange service was resolved, it is not at all certain that CITC would be an instant convert. As White makes clear, there is a great deal of difference between investigating something on a trial basis and committing to it for day-to-day use.

"We have no intention of implementing anything on a production basis," he says. "We're involved in the trials to make sure we're staying current with what's happening and to give input to vendors. Our fear was that if we didn't get involved at all, a year from now we would have to start from scratch."

"ISDN has to be able to save us money and make the network easier to manage," White maintains. If ISDN cannot prove itself on those points, he says, Chevron will continue to use current digital networking technologies, such as T1.

Still unknown

Right now, price and availability are two of the great unknowns when it comes to ISDN. As Nolle observes, most corporations don't need to worry about going out and buying ISDN tomorrow, because it will not be available tomorrow. ISDN tariffs have only been filed in a few metropolitan areas. Interexchange Primary Rate service is currently not commercially available.

"If we are going to use ISDN for POS," White says, "it has to be ubiquitous where we run Chevron stations. That will probably not be the case for at least two years. That is what we are going to have to be hearing toward."

As for prices, not only is the "right price" not available, but in almost every case, no firm prices at all exist for ISDN services. Current ISDN tariffs are almost always specific to a particular customer, notes Chuck Kumpke, vice-president of marketing at Telxon Communications, Inc., which manufactures an ISDN terminal adapter for PCs. There is no guarantee that anyone else could get the same tariff, he notes. In addition, these tariffs are incomplete. For instance, Nolle says, commercial interexchange ISDN tariffs are not yet available.

"We don't know what tariffs are going to be to go across the country with ISDN," White says. "So far, we have seen tariffed Centrex ISDN services. We would be interested in tariffs for Primary

Rate ISDN to provide a backbone for a network of PBXs. It is unclear what is going to fall out there. Even on the POS terminals, if you were making a POS data call, it is unclear what the tariff will be. Will there be any WATS kinds of tariffs, for example? No one knows."

However, if current tariffs for Centrex-based ISDN are indicative of future pricing trends, ISDN may be competitive with alternate services. For instance, Roy reports that ISDN is working out well for Teneco financially.

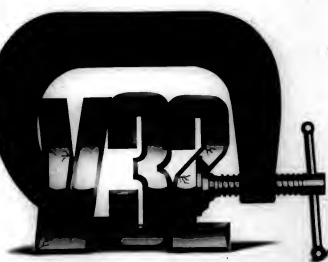
"The operating lease for our station equipment is less than the lease for station equipment for the IA2 key equipment that preceded it," Roy explains. As far as line costs go, he says an ISDN line costs only about a dollar a month more

What's happening in ISDN

The following illustrates the major events in the Integrated Services Digital Network arena during 1988

- Primary Rate access
- Private branch exchange and front-end processor interconnection
- Private line ISDN connections
- B channel "wake-up"
- Use of digital cross-connects
- Interexchange carrier access
- Interim arrangements (without CCITT Suggestion System No. 7)
- LAN interconnection
- More supplementary services
- Public-Switched Digital Service (64K bit/sec.) interconnection
- Multimedia conferencing (voice, data, slow-scan video)

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Across the map

The number of Integrated Services Digital Network trials throughout the country doubled in just a year



SOURCE: BELLSOUTH
CIC CHART

Rate Interface provides, he notes.

"ISDN is certainly no replacement for a LAN," he asserts. "For virtual disk activity, I don't know that 64K bit/sec. is acceptable."

White adds that virtual disk activities will become more important as closer linkups are developed between mainframes and PCs.

"We are going to need more and more bandwidth between PCs and mainframes," he observes.

Primary Rate to the desk top could theoretically provide that capability, but White says he believes it would take a new generation of PBXs or central office switches to support that kind of bandwidth to large numbers of desk tops.

On the other hand, Roy notes that 64K

bit/sec. is not only adequate but excessive for some applications. Hooking up to a modern pool that, in turn, connects to the outside world at 2.4K bit/sec. does not make use of most of that 64K bit/sec. capacity, he points out.

On the other hand, he says, 64K bit/sec. is preferable for applications such as file transfer or transfer of image data such as facsimile; thus, ISDN users will probably want to have lower and higher speed interfaces to the PC.

White is also concerned about distances from Chevron service stations to ISDN central offices and the potential noise, attenuation and distortion problems.

The U interface specification for ISDN — the standard ISDN user interface — prescribes a maximum of 18,000 feet from the customer site to the central office, and a lot of Chevron service stations are farther from the central office than that, White says.

Clean up their act

Even within that distance, White says he wonders whether the divested Bell operating companies have pain clean enough to run ISDN.

Impulse noise, cross talk and bridge taps can all cause problems for the high-speed ISDN digital signal. Much of this depends on various random factors affecting the ability of telephone lines to transmit digital signals cleanly and clearly, such as what other signals are going through the lines and the presence of loading coils and bridge taps.

"I think there is going to be a lot of work on part of the operating companies to clean their outside plant," he says, noting that in some cases, the divested Bell operating companies may not be able to get a clean pair from point A to point B. "There may be other pairs in the same cable sheaths that are noisy," he says. While the noise may not cause any problems for voice signals, it may prove fatal to high-speed digital signals.

White speaks from personal experience. "My house is a mile from the central office," he says. "They have spent more than a month trying to figure out how to get ISDN into my house. They're still working on it."

Roy, however, says that Tennenco did not have a problem with dirty pairs. All of its sites are within the U interface specifications, and loop tests were all well within ISDN specifications, he says.

Future understanding

With all the pros and cons, problems and uncertainties surrounding ISDN, what should companies be doing today to prepare for ISDN in the future? The major thing, Roy says, is to understand the service, the technology and its application to business requirements.

"You need to know how ISDN can be configured to be most cost-effective for your business applications," he explains. "For example, 'What features and functions do I want to provide the end user?' There are many alternatives, he points out, and it is possible to err by giving the user too much or too little.

Nolle agrees: "The question is how to get most bang for the buck in the ISDN environment. Try to determine when you will reach a decision point. Identify your major vendors, and find out what their ISDN commitments are. Then make an assessment based on current ISDN economics." •

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CPE: Where the similarities end

BY PAUL KIRVAN

Now that Integrated Services Digital Network (ISDN) has achieved real-world status, it's time for people to prepare for up-close-and-personal contact with the technology.

The confrontation should not be too jarring because equipment that has been

Kirvan is head of Paul Kirvan & Associates, a Tuxedoville, N.J.-based consulting and technical services firm specializing in voice and data communications.

available for the past four years has done much to pave the way for ISDN. A classic example of this is the T1 multiplexer.

T1 multiplexers, which are also known as "smart" multiplexers, dynamically allocate bandwidth available from a DS1 circuit. You can use the same circuit for voice, data, facsimile and image applications. Many of you have successfully used this technology in your networks. Your networks already operate, if the truth be told, like an ISDN.

Another example of forerunner equipment is digital access and cross-connect

ed systems. These systems also permit effective switching, manipulation and management of T1 bandwidth.

Then there are private branch exchanges (PBX). Certain ISDN features have been available on digital PBXs for years, including simultaneous voice and data over shared wires and a single switching network for both voice and digital data calls.

Incoming call detail is available today from practically every digital PBX on the market. Multibutton phones will access numerous features via a single button,

and users will be able to program feature buttons as needed.

You will be able to unplug a phone and move it to another outlet; the system will automatically reconfigure itself in the new location. Most familiar features, as well as new ones, will be available.

ISDN's sponsors want it to be all things to all people, particularly in data communications. Both circuit switching and packet switching are provided. Data rates from 50K to 64K bit/sec. are supported on a B channel.

Depending on the type of service, a D channel can transport data at up to 16K bit/sec. (Basic Rate) or 64K bit/sec. (Primary Rate). Higher capacity H channels can support applications such as video and computer-aided design and manufacturing. Future broadband-based ISDNs will support millions of bits per second throughput, similar to the performance of today's local-area networks.

So there are some definite similarities between available technology and ISDN.

FUTURE broadband-based ISDNs will support millions of bits per second throughput, similar to the performance available on local-area networks.

But there are also some big differences that must be factored in as firms grapple with the questions of whether they need ISDN and whether they can afford it:

- **Scope.** The examples mentioned above are customer-premise services, available only at the system level. ISDN will be available universally, just as dial tone is today. The big questions are: Do you need it? And can you afford it?

- **Switch.** A service. ISDN is a switched service. Most of our current networks are built on dedicated transmission circuits, such as T1. The goal is to develop worldwide switched digital networks, all of which interwork with each other and make resources available on an as-needed basis.

- **Protocols and interfaces.** ISDN signaling is performed over a separate channel, called out-of-band signaling. The signaling protocol for this important element is Signaling System 7 (SS7), defined by the CCITT.

The rapid and widespread deployment of SS7 is critical for ISDN success because SS7 distributes ISDN network intelligence to all elements in the network. Similarly, acceptance of these ISDN interfaces by manufacturers is necessary for ISDN to be viable.

Case in point

A case in point is the U interface, probably the most important customer-premise equipment standard right now. This two-wire specification defines how customer premises equipment connects to the ISDN.

A necessary complement to the U interface is Network Termination 1 (NT1), which terminates the ISDN channel on a customer's premises. Unfortunately, most of the currently available U interfaces face chips do not conform to the ANSI standard.

This means the NT1 being installed today will have to be replaced in two or

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three years. The tab for this could run in the hundreds of thousands of dollars for large companies.

ISDN gets its biggest boost from central office equipment suppliers, primarily AT&T Network Systems, Northern Telecom, Inc., GTE Communications Systems, Inc. and Siemens Information Systems, Inc. They have invested heavily in developing ISDN capabilities for their systems, realizing that ISDN acceptance will have a major impact on future revenues.

To that end, central office equipment suppliers sponsor ISDN trials and provide the necessary stimulus for CPE manufacturers. So far, the trials have been positive, but only the ISDN subscriber interface is being tested. Unfortunately, that is not the ANSI specification that will eventually be used with "real" ISDN.

ISDN premises equipment has already taken several familiar forms. Station terminals, referred to as TE1 in the CCITT I-Series Recommendations, have begun to appear with some frequency in the last few months. Both AT&T and Northern Telecom, for example, have ISDN terminals that work on SESS/System 85 and DMS-100/SL-1 systems, respectively.

You get what you pay for

The prices for this equipment are slightly higher, than those of comparable models. But, of course, you get more from each device.

Steve Cunningham, Northern Telecom's director of Meridian Systems Marketing, cautions users to be careful about making apples-and-oranges comparisons.

"If your needs are strictly for a 2500-type set, the cost difference between the real thing and an ISDN counterpart could be significant," he says. "But as you start talking about feature-rich terminals, you can expect the price gap to narrow quickly."

Other CPE manufacturers have been announcing ISDN station equipment or PBX interfaces that implement the ISDN-defined subscriber interfaces. However, the cost of this equipment remains higher than the optimum price range for mass-market penetration.

ISDN station equipment typically costs between \$600 and \$1,000 per set, including the TE1 and NT1 components needed for Basic Rate service.

For now, those prices are comparable to the per-line cost for a fully configured digital PBX system, but most experts predict that ISDN prices will decline dramatically with competition and volume manufacturing over the next few years. Look for a basic ISDN station to cost from \$100 to \$150, including the NT1.

With regard to network services, telephone companies are currently pricing ISDN Basic Rate subscriber lines at about 1½ to two times that of standard business lines.

However, digital technology and switched network access should significantly reduce costs over time. Hopefully, these savings will be passed on to subscribers.

Numerous vendors have announced they will manufacture ISDN subscriber interface components. As equipment becomes available, cost and practicality become the issues. But until both side ISDN CPE interfaces are deployed, we will continue to have market confusion. By the way, be careful of companies that stamp "ISDN" on their products. Make sure they are really compatible with ISDN. ■

BY JEFFREY NEIL FRITZ

At West Virginia University, we are going through the necessary but nearsighted phase of discovering how ISDN can duplicate, in a somewhat better fashion, the current telecommunication applications on campus.

Within the next 12 to 24 months, we hope to stop asking. How can we perform this function with ISDN? and start asking. What can ISDN do for us that is not presently being done?

WVU consists of three campuses with a two-mile radius served by two central offices. Included are a law college; a medical college with a related hospital; and diverse colleges for studies ranging from engineering to journalism.

Data is heavily used on campus. Offices and classrooms contain everything from terminals to personal computers to minicomputers.

Ethernet and Token-Ring, analog modem lines and a central office local-area network are the most common data paths on campus. A campuswide Ethernet backbone is planned, but the funding is not yet in place for such a massive proposition. As a result, most of the LANs exist within buildings but do not interconnect.

In the central office LAN, which has been in service since 1987, the university was able to get a forerunner of ISDN, which did not arrive until this year. A central office LAN is one run over Central from the telephone company's central office; it is a precursor to ISDN. Like ISDN, it offers simultaneous voice and data over a single telephone line. Data can be either synchronous or asynchronous at speeds up to 19.2K bit/sec.

ISDN made its appearance at WVU Aug. 15, 1988, three years after the order for it was placed and just over a year past the expected date of installation.

We started small, with just 12 lines that were cut to the ISDN Applications Laboratory. The lab, a cooperative venture between WVU and Chesapeake and Potomac Telephone Co. of West Virginia, develops ISDN applications, evaluates customer-provided equipment and shows cases on-campus implementations.

Since August, several more lines have been brought up at various test points around campus, but we are proceeding slowly in order to guarantee that the service is distributed wisely.

WVU is a divided camp. Faculty members are heavy asynchronous users and tend to direct their data to the Digital Equipment Corp. VAX systems. Since ISDN leads itself well to synchronous solutions, these will be among the first groups to migrate to ISDN.

The administration, on the other hand, is primarily made up of synchronous users. These are the heavy-duty IBM and Unisys Corp. mainframe people. There is not an easy path to ISDN.

Vendors that support synchronous ISDN solutions would like us to throw out the controllers and run the ISDN line back to their front-end processors. That would, they claim, eliminate the cost of terminal moves. Sounds nice, except that controllers are dirt-cheap and the same is

not true of ISDN synchronous CPE. Each terminal requires ISDN central elimination devices costing in excess of a thousand dollars.

Right now, the ISDN data traffic is mostly directed to the West Virginia Network for Educational Telecomputing (WVNET). WVNET is a state-run computing center used by the Board of Regents and the higher



West Virginia's Fritz

educational facilities throughout the state. WVNET operates two IBM 3081 mainframes, a Unisys mainframe and several VAXs.

Most data now arrives at WVNET via modems operating at 1,200 bit/sec. By eliminating the modems and the need for a second analog line, ISDN will reduce telecom costs and provide better service.

ISDN is like unfurled clay. There are many ways it can be molded to serve the university's telecommunication needs.

It offers significant communications tools well suited for campus use such as high-speed file transfers, slow-scan video and computer conferencing. Impromptu LANs or wide-area networks can be

formed via ISDN. ISDN can either be a LAN itself or serve as a LAN bridge for Ethernet or Token-Ring.

ISDN-compatible software is already available that allows message, electronic mail, remote control operation and file transfers between PCs. This software can work in the background while the user works in the foreground. The user can be knee-deep in a Lotus Development Corp. 1-3-3 spreadsheet and receive an alert that urgently needed data is about to come his way or, even better, is already there without any action on his part.

Sharing the screen

But with appropriate hardware and software, the ISDN network can do more than just share printers and transfer files. A technique called screen sharing will allow users at different locations to see and work on each other's screens in real time.

At present, this is a somewhat limited feature, because ISDN is implemented in an "island-hopping" approach. Simply stated, that means each central office is its own ISDN network. An ISDN user in San Francisco cannot currently interconnect ISDN features with a user in Baltimore or Atlanta. But clearly, screen sharing could offer significant advantages for an institution like WVU, which has extensive education programs located all over the state.

ISDN is an exciting and challenging telecommunications service, and using it can spoil you. When I return from the lab to my office, which does not yet have ISDN service, I feel like I'm using a second-rate telecommunications service. ■

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Fritz is a data communications analyst at West Virginia University in Morgantown.

INTERVIEW

Snapshot of the French scene

An early implementer of the French version of ISDN tallies up his organization's experience with using the service to deliver visual data for dealer product maintenance. The conclusion — It scores high for efficiency and economy.

Service SA of Marne-la-Vallée, France, is a subsidiary of Netherlands-based Philips Group and supplies after-sales service for consumer goods sold in France. The firm provides technical assistance to dealers that repair these products.

In June, Service SA signed a pact with France Telecom, the government-controlled common carrier, for implementation of RNIS (the acronym and trademark by which ISDN was known in France until two weeks ago, when the service was renamed Numéris). MIS Manager Jean-Claude Bouchon recently spoke with free-lance writer Raymond Boudit about his company's experiences with and plans for ISDN.

How are you using ISDN?

We are starting to use RNIS to supply pictures interactively, to illustrate the textual dialog of Sexsy, the Service Expert System we specifically designed to help dealers — our customers — repair products.

Up till now, pictures to be used in conjunction with Sexsy have been supplied both on paper and by means of videocassettes delivered by hand. This requires a complex workstation at the customer end, including not only a Minitel videotext terminal to handle interactive textual information but also a TV monitor and a VCR for noninteractive picture display.

And how does the expert system now work with RNIS to make these pictures available?

Sexsy calls up the pictures automatically via RNIS as required. It "knows" the reference numbers of pictures. In fact, these references are displayed on the screen as part of the text.

We could not include the pictures themselves as part of the text because Sexsy uses the Minitel videotext system, which does not have enough definition or transmission speed to permit that. We did think of combining the textual dialogue and the pictures in the RNIS, but that idea was also rejected because it

would have required too many modifications to Sexsy. What we decided to do, instead, was to use a dedicated file server to supply pictures as an add-on to Sexsy.

What is the business advantage of providing interactive pictures?

There is a major problem in updating the picture information we supply to customers on paper and cassette. With RNIS, new information can be entered to the picture base as it becomes available.

How far have you progressed in your use of RNIS?

The first customer, a dealer based at Rennes in Brittany [about 300 miles west of Paris], was connected to RNIS by France Telecom Nov. 21. Nine other customers will be on-line by the end of the year, using Philips PC-compatible microcomputers, equipped with an add-on RNIS board specially adapted from the existing XCOM Transcom board. [Transcom is a 64K bit/sec. switched datacom system provided by France Telecom; it has about 400 subscribers in France.]

Are you planning to use RNIS in a more widespread and ambitious way in the future?

We are aiming to have about 1,000 customers connected in France by the end of 1990. The object is to reduce the customer workstation to a PC-compatible microcomputer. We expect sister companies in other countries to adopt similar systems, once ISDN is generally available. They will probably use common, centralized picture databases, updated directly by the appropriate design departments wherever they are located. Finally, we want to extend our own system, which at present covers only CD players, to the other products we support.

Did you encounter any particular difficulties in implementing RNIS?

The main problem was the

choice of a technical partner for specific software development. We spent about three months looking around among the large and small software and services houses. We finally chose a small firm — Sarde — mainly because they had picture compression and processing software up and running.

What kind of costs were involved?

Total development cost for the software was about 1.3 million francs [8216,000], hence equivalent by France Telecom and Sarde



Service SA's Bouchon

under the partnership agreement, which is the basis of France Telecom's strategy for launching RNIS.

In terms of our own investment, we estimate that our personnel spent a total of about two man-years on the project.

What about the expenditures for customer-premises equipment?

RNIS-compatible PBXs are not needed until Primary Rate access (2M bit/sec.) becomes available. Philips PCs equipped with Minitel-compatible videotext boards are financed at cost by Service SA. Adapted XCOM boards are lent by the manufacturer, OST, for the pilot system and will be charged for later. Specific RNIS subscriber equipment is installed by France Telecom at commercial rates.

Why does your system use both RNIS and Transcom?

At present, RNIS is available only in Brittany and in central Paris. Where we are located [about 20 miles east of Paris],

RNIS is not yet available. So we make up the pictures here with the help of a scanner, then we transmit them off-line by Transcom to update the on-line picture base owned by us and operated by Sarde right in the center of Paris. It is this picture base, which resides on a Compaq 386 20-MHz computer, that is connected directly to RNIS.

What do you see as the main differences between Transcom and RNIS?

An RNIS call takes about two seconds to set up, against 20 to 25 seconds for Transcom. That's important when you're operating interactively. Major savings are realized on the cost of calls because, given the latter call time, customer technicians are willing to call up the picture base when they need information, instead of leaving the line open. Moreover, our system uses both RNIS B channels for data communications, so we get double the overall bit rate compared with a Transcom line.

What benefits have you obtained from RNIS?

The most obvious saving is in the direct cost of the average repair. A repair takes about one man-hour of skilled labor, which costs around 200 francs in France. Of this time, two-thirds is spent on diagnostics and one-third on the repair work.

Using RNIS cuts the diagnostics time in half, so the saving is about 70 francs per repair. This compares with RNIS' specific additional cost, which we estimate at 50 francs per repair. So the direct saving is 20 francs, about 10%.

Also, in addition to our being able to get information to dealers more rapidly, we will eventually be able to get information back more quickly.

Eventually, for example, statistical information on repairs will be fed back to quality-control departments at the production units. And this will happen maybe 10 minutes after the technician has diagnosed the fault, instead of two months later, as it happens now. ■

Limits

FROM PAGE 1

those groups how information technology contributes to the bottom line, and the typical answer is that technology enables each group to pursue its corporate strategy.

"Our overall strategy is trying to keep American Express as decentralized as possible but keep economies of scale when

possible," says Roy Lowrance, vice-president of technology strategy at American Express' New York headquarters. "We are technological consultants. We have no authority at all. We give operating responsibility to the divisions." The boyish-looking Lowrance, who casually sucks a lollipop as he discusses expert systems and computer-aided software engineering (CASE), heads the corporate group.

Lowrance's team coordinates volume purchases, evaluates technology and vendors and organizes quarterly meetings of the Business Unit Systems Executive Committee. The committee, which is composed of the subsidiaries' IS executives, encourages efforts such as mutual backup and peer-to-peer advice. Lowrance also manages a companywide research and development fund for Gertner, who is a driving force in the organiza-

tion's use of technology.

"American Express is one of the few companies I have seen that isn't trying to do what everyone else is doing with technology. They have a phenomenal ability to find good, profitable applications and get them in place," says Bruce Rogow, executive vice-president at the Gartner Group, Inc. Rogow adds that American Express, a Gartner Group client, does not copy other companies' success-

ful strategies but focuses instead on its own key applications.

According to Gertner, "What I want to be able to do is make sure that every customer of American Express knows that the individual employee they are dealing with has all of the resources required to answer their questions and to otherwise serve them." One major resource is information power, and here follows the IS tales of American Express' subsidiaries.

Travel Related Services

As American Express Travel Related Services (TRS) grows, so also grow its systems — only faster.

The number of American Express credit cards, now more than 27 million, increased 80% during the last five years. But TRS' systems capacity has actually outstripped the cardholder base, because "we keep coming up with new ways to support the company's services," says Gerald Cupp, executive vice-president. CPU capacity has grown there some 30% per year during the past five years.

"Information management is our product; we can be either the facilitator or the bottleneck," Cupp says.

Fast and focused

Like gunfighters in the Old West, systems programmers at TRS learn to be fast and focused, according to Cupp — fast because they have to keep up with the credit card company's rapid deployment of new products and services, and focused because of a TRS management mandate to balance high tech and high touch when it comes to serving its cardholders.

"There's no question that computer technology has given [TRS] a decisive competitive edge over purveyors in the bank card business," says Albert J. Cushman Jr., senior insurance analyst at Morgan Stanley. TRS gains a particular edge, he adds, in its ability to provide better customer service and new products. The company has added "a huge number of extra bells and whistles to the card in the last year," including an 800 number for emergencies and warranty programs for purchases made with the card. "For these things to work, they need the technology behind them," Cushman points out.

While giants like Citicorp have implemented comparable technology, "a lot of bank card

vendors are not prepared to make that kind of investment," Cushman says, partly because the bank card business offers smaller returns than the travel and entertainment business.

About three years ago, corporate-level management at TRS identified specific types of technology for the IS group to focus on in its quest for new applications to bolster the firm's competitive position, particularly in the area of customer relations. Among the technologies that IS has deployed since then are image processing, voice processing and artificial intelligence.

TRS recognized more than a decade ago that it would need image scanning and storage to keep its "country-club billing" system afloat, Cupp says. Customers like to have receipts in-

cluded with a credit card bill, but this service has become expensive and difficult to manage because of the huge amount of paper that must be processed.

In 1984, IS found the imaging technology it needed from Technicon Financial Services, now a TRW, Inc. subsidiary. The system has enabled the company to preserve an important feature of its customer service, Cupp says. It also saves money: Processing images is less costly and takes less time than processing paper.

More debatable are the ultimate benefits of certain voice processing applications, Cupp points out. TRS' service center takes five million calls per month from customers requesting everything from current outstanding balance to travel directions in a strange city. Combining a voice



American Express' Cupp balancing high tech with high touch

response system with an information system would enable many queries to be handled automatically. But TRS has held off implementing such a system because some people resent dealing with a computer, Cupp says.

On the other hand, the company has been aggressively deploying voice technology to facilitate contact between its human representatives and customers. One such system now targets prospects, keeps dialing until it makes contact and only then brings on the human sales representative.

Applying requests for credit is another area at TRS where high tech complements high touch. Computers do initial screening of credit-check calls and pass on to a human agent any application that cannot be immediately approved. An expert system called Authorizer's Assistant helps the agent evaluate the application, automatically calling up relevant account data and recommending a course of action.

Telecommunications is one high-tech application that was not identified as a new focus area, Cupp says, because the company had already invested hundreds of millions of dollars in a worldwide network beginning in 1975.

TRS' global Integrated Telecommunications Network is a high-speed backbone for voice, data and video consisting of multiple T1 links between Network Equipment Technologies, Inc.

IDNX switches. The 34-node IBM Systems Network Architecture network delivers information to some 30,000 workstations residing at branches in more than 120 countries.

Five-year plan

TRS' current five-year telecom plan, launched in 1985, calls for a "high-level high-speed integrated voice/data video telecommunications network," says William Tindall, vice-president of operations and services for TRS' Worldwide Telecommunications Group. A plan for the 1990s is now under discussion. "We could go to (45M bit/sec.) D3 facilities; we do know we have to make some changes in the 1990s," Tindall says.

A sweeping high-tech planning effort now under way is the Genesis Project — a combination forecast/planning program for predicting "what the business will look like and what technology we should implement to take advantage [of that environment]" during the next five years, Cupp says. "It is not a systems project, but more of a business vision," he emphasizes, adding that standardizing the systems environment throughout TRS may be an initial step.

The IS group is considering whether to design an intelligent workstation standard for systems developers and service representatives; that standard might be based on the Apple Computer, Inc. Macintosh or the

At A Glance

American Express Co.

1987 revenue: \$17.8 billion

1987 net income: \$533 million

Employees: 84,278

Information spending: \$1 billion (estimated)

Primary systems: 40 mainframes, including 26 IBM 3090 systems, for an estimated mainframe power total of 1,500 MIPS; DEC RISC 8000-class superminicomputers; 21 Data General MV minicomputers

Workstations: More than 60,000 terminals and IBM or compatible PCs

Data lines: About 3,500 synchronous, bi-synchronous and IBM SNA lines

Storage devices: More than 2,000 IBM 3380-type disk drives; about 800 high-end tape drives

Front-end processors: 120 IBM 3705 and 3725-type machines

Printers: 99 IBM 3800-type laser printers

CV DATA

IBM Personal Systems/2, he adds. "There are multiple options on what it should be. I suspect we won't have just one [standard]," Cupp says.

In the meantime, Cupp's programmers always seem to be playing catch-up with TRS' phenomenal growth as a company. Not counting production facilities, system development has grown 300% in 10 years, according to Cupp. The company probably has one of the largest IBM IMS transaction rates in the country and has been increasingly deploying IBM DB2 applications, he adds.

The firm is also considering decentralizing some databases on network servers such as PS/2s and departmental processors so that work groups can do their own modeling or data managing without having to go through IS all the time, Cupp says.

Cupp's group is always on the lookout for tools to help develop new software to support TRS' ever-growing arsenal of services and products. To date, IS has

never missed a product launch, he boasts. And while CASE offerings have been helpful, Cupp says, "We need a breakthrough in the design process."

Cupp's ideal situation would be for users to state their business objectives in business terms and run the requirements through a process that would generate the software to support those needs, he adds, saying he believes that American Express is closing in on technology to achieve that goal.

Shearson Lehman Hutton

When Shearson opened its state-of-the-art data center in 1986, it felt safe knowing the 90,000-square-foot center could support ample corporate growth by converting 120,000 square feet of mis-

floor construction then being used as office space. Little did the planners know that some of that space would be gobbled up within a year.

"We built it with the idea of eventually being able to double our business. I didn't have it on-line for a year, and all of a sudden, we decided to double our business by taking E. F. Hutton in," recalls Rick Morrison, senior vice-president and co-chief administrative officer for what is now Shearson Lehman Hutton. Since the E. F. Hutton & Co. acquisition, the company's data center has grown by 20,000 square feet so far, primarily to handle the increased disk storage and printer needs.

Morrison cites the IS group's handling of the E. F. Hutton merger as an example of how the group contributes to profitability. He notes that Shearson most acquired a company almost as large as itself while increasing IS spending by only 25% to 30%. He says the organization and architecture that IS now has in place will support further corporate growth with only minimal growth in IS expense and manpower in the coming years.

Through more than 40 mergers, including the one that brought the company

into the American Express fold, Shearson has grown from four founders in 1860 to 40,000 employees today. The most recent major merger was the Hutton acquisition, which Morrison reports is "for all intents and purposes done." The IS operation now must process up to three million transactions, including cash transfers and inquiries by 11,000 financial consultants, but not including the thousands of stock trades the company handles.

Shearson Lehman relies completely on information technology. It refuses to offer a new service if it cannot be automated—basically, Morrison notes, because the fi-

"OUR database strategy is centralized in that everyone sings from the same hymnbook."

RICHARD MORRISON
SHEARSON



nanical industry is made up of bright people, telephones and computers. However, he adds that Shearson has seldom been a pioneer in technology, preferring to let other companies break new ground.

One of the technological areas in which Morrison claims Shearson has set a pace is in laser printing. With 30 of IBM's

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host-based 3800 printers, Shearson prints about 14 million pages of customer statements per month. "When we print, western Canada falls," he jokes.

Shearson runs IBM's two largest systems — a 3090 Model 600E and a 3090 Model 600S — as key hosts. But Shearson's computing demands stretch the limits of even those powerful systems and software such as IBM CICS, and the company has responded with a tighter relationship with IBM.

"There are two schools of thought within the American Express family. One says that you can leverage IBM better by throwing a competitor up against them," Morrison says. "There is another strategy that we use, which is to create a partnership with IBM and leverage that." Shearson confides in IBM on plans so that when a merger comes along, IBM knows what it has to do to deliver the systems Shearson will need. "Does that have a value? Yes, it does to me," Morrison says.

Shearson is one of a handful of companies IBM selected for a special relationship, now three months old. The arrangement allows key customers to look deep into IBM's development schedules for hardware and software at the bit level. Shearson personnel visit IBM, and IBM "to see if there are, in fact, directions that they are working toward that maybe we could expedite and bring in sooner or change," Morrison adds.

He hopes to do with products like CICS what Shearson did with printing technology through use of the 3800s and Advanced Function Printing. Such sophisticated printing for customer statements has been a key application in other American Express groups such as TRS and IDS Financial Services. "It's given us a strategic leg up on our competition in how we can present information for a client," Morrison says.

Host-related issues such as laser printing and capacity planning represent only one set of challenges for Shearson. The IS organization is also working to distribute its databases and install new user workstations. The need to distribute technology better was identified by a 1987 technology audit conducted in all American Express groups.

Single the database's problems

"Our database strategy is a centralized strategy in that everyone sings from the same hymnbook," Morrison says, noting that almost every Shearson system has basically the same application coding technology, database and interfaces. "From a database point of view, that is how we control our destiny as opposed to others who have gone piecemeal and can't get these things to talk to one another," he says.

Shearson plans to distribute some data to new LAN-based branch office systems developed in conjunction with IBM and ADP Financial Information Services, Inc. Those systems, scheduled for rollout this month, feature IBM Token-Ring networks with IBM PS/2 Model 80 servers and dual-disk PS/2 Model 50 workstations. The new systems will replace dedicated terminals that currently handle the broker's trading activity and provide brokers with information such as stock price quotes.

"The host is the platform that owns the information. The ad hoc reporting will be out in the branch or at the workstation," Morrison says.

Development of that broker system

also involved user input, with users making key decisions. In such cases, Shearson pairs IS professionals with representatives from the business side, working out details such as screen faces, keyboard design and service requirements.

However, IS makes the key decisions on other types of systems such as a new security system that all users need.

"Now, the user doesn't have a say in that. That is a corporate say," Morrison points out. "It says we want to do that, we have to do that and you, Mr. Business Unit, have to absorb that cost because it is part of playing the game." The business units control their development and their priorities, but not their budgets nor what Morrison calls Shearson-mandated projects, which are in the IS group's hands.

IDS Financial

American Express executives talk about how they use technology and frequently point to the amount of information they want to place in the hands of employees who deal directly with customers.

That concept was behind one of the first IS efforts undertaken when the company acquired Minnesota-based IDS Financial five years ago.

The heart of IDS' business is personal financial planning and related products such as life insurance and mutual funds. It is a business that IDS officials describe as tremendously data intensive — because of the amount of information needed to draft a personal financial plan — and thus

dependent on information technology. It also is a business in which IDS showed a 25% revenue growth and a 21% profit growth between 1986 and 1987. IDS has rewritten its client system so that clients are treated as households rather than as account numbers for individual products.

"The most visible piece of that system is our consolidated statement. As an IDS client, all of your holdings with us can be on one statement. That can be your insurance policy, your mutual fund holdings, your IRA, your Keogh group, whatever. It all comes to you in one nice package," says Vice-President for Strategic Planning and Architecture Carl Behl, noting that the previous industry approach was to mail separate account statements for each of a client's accounts. He says the

Can your
async network
pass this simple
test?

consolidated statements allow customers to see their financial portfolio in a single statement. It also gives IDS the advantage of minimizing the number of human and electronic transactions involved in a task such as a customer address change.

The system, which took almost three years to develop, is actually a shell around operational systems — some old and some as new as the mutual funds systems that went on-line last month and an insurance system currently being written.

The client system is based on IBM CICS VS and DL/I and runs on two IBM 3090 Model 600E mainframes. In retooling the applications to run within that client processing shell, IDS claims an advantage over its competition.

Developing an insurance or mutual

funds system means IDS does not have to repeat modules such as billing, mail or client processing, which are already built into the client processing shell. "So all we have to do is build the insurance-specific stuff," Beihl says. "That gives us some what of an advantage in that we can look at [more] architectural issues than if we were just building a big 3090-based monolithic insurance system."

The client processing system is a primary tool for IDS' service personnel and 6,200 financial planners. However, recognizing that a variety of different types of employees must deal with the system, Beihl notes that he wishes IDS had given more thought to the user interface.

"When we put together our client environment, we were not thinking of the

work force issue. We developed a system that deals with a very complex problem in a relatively complex way," Beihl says. He notes that the work force has changed, with some users demanding the type of graphical interfaces offered by vendors such as Apple and other employees — drawn from less technical portions of the work force — needing that type of interface to handle the system.

Like other American Express groups, the financial planning system uses hot technologies such as expert systems in rewriting its major systems, but, Beihl says, IDS and the other units also know where they may want to avoid high-tech applications.

"We try to deal over our clients' kitchen tables mostly. One of the things that we don't necessarily believe in is that ei-

ther our planners or our clients want to use technology directly in that transaction. We think it is intrusive to sit down and have a computer between you and the client," Beihl says.

"We've got prototype workstations here that can handle known as a 'mocha off,'" he adds, "but that stuff is never going to see the field until we are sure it is really going to enable something in the business out there."

One of IDS' major new efforts is in the rollout of an expert systems-based financial planning tool known as a "mocha off." Built-in-house for IBM Personal Computers, Insight processes client information

WE TRY to deal over our clients' kitchen tables mostly."

CARL BEIHL
IDS FINANCIAL

collected by a financial planner and develops recommendations for the planner to offer the client.

Insight is being moved out from IDS headquarters in Minneapolis and is scheduled to be installed in half of IDS' 200 divisions by January. The system, in effect, merges the capabilities of numerous software modules that previously supported each IDS product area.

Beihl cites Insight as a product of the teamwork and "environment of excellence" that exist in IDS and the rest of American Express.

When asked how IDS attracts good IS people, Beihl states, "We keep them." He says IDS' 800-person IS group has only an 8% turnover rate — compared with national rates, which have been estimated at up to 17%.

He also notes a difference between IDS and other companies in terms of employee loyalty. "I see it among some of my friends out in other companies, where they are more programmers or systems programmers than they are employees of that company," he says. "The relationships that we have with our users would be more difficult in other environments. You don't have to create that unity, you don't have to work hard at getting teamwork between users and technology people because it is already there."

American Express Bank

While the other American Express companies come across as aggressive and innovative users of computer technology, American Express Bank long ago decided to go with inexpensive Honeywell, Inc. minicomputers with just enough horsepower to run basic business applications at each of its international branches. As applications and users have proliferated, however, those minis have turned into a computing cul-de-sac from which the bank is trying to escape — and the cost of that escape is estimated at between \$10 million and \$20 million.

When Executive Vice-President William Butts moved to American Express Bank from Shearson six months ago, he took over a major conversion effort from

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his predecessor, Alden Fiertz.

The decade-old Standard Banking System, written for Honeywell Bull, Inc.'s DPS 6s, is to be replaced by a new system based on Colliet Software, Inc.'s IDMS, Standard Banking System software and IBM mainframes.

The DPS 6s, which worked well as branch systems five or 10 years ago, are now buckling un-

der their processing load. Bautz points out that the vendor provides no practical migration path even to the next level in its own product line, the Honeywell Bull DPS 7000 family, which would probably provide only temporary relief.

Moving to the new IBM/Colliet system will cost the bank up to \$20 million, including hardware and software expenses and

the conversion of software applications from the old Standard Banking System, Bautz says. The bank has accepted that price tag since "we have to get off the Honeywell equipment," he adds.

Worth the expense?

One person who is somewhat puzzled by the bank's expensive move is James Raney, who had Bautz's job until 1985 and is now

a partner at Peat, Marwick, Main & Co. Branches were already having trouble fitting their applications on DPS 6s during Raney's tenure. "We got quotes that it would take \$30 million to rewrite the software on IBM, and we didn't want to spend the money. When I left, that was where we were."

In the year before he left, Raney's group developed what it

considered to be an inexpensive yet adequate solution: Take the Honeywell code, build a compiler and recompile it under IBM so that everything written for the Honeywell computer could run on an IBM 4300 quasi-emulating a Honeywell. Those 4300s are still running the Standard Banking System at various branches around the world.

While this seemed the best solution in 1985, the bank may be justifying its new system based on 1990s business needs, which may call for "more of a management information database," Raney says.

Bautz points out that the bank expects to get more from its conversion to Colliet than just increased CPU horsepower. The IDMS-based system should provide greater flexibility and speed for applications development. For example, systems people will be able to employ a common client definition throughout the company, allowing different branches to access the same



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— Joseph Sestito
President
Tridex Corporation

At Tridex Corporation of Nashua, New Hampshire, the sales team often wins customers by being customers. That's because the company, which deals in new and used DEC and DEC-compatible equipment, is active in buying as well as selling these products.

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THE BANK has accepted the \$20 million price tag since "we have to get off the Honeywell equipment."

WILLIAM BAUTZ
AMERICAN EXPRESS BANK

master client file, "so that if a guy wants a loan in the Far East and has a checking account elsewhere, you can access the different accounts," Bautz says.

In addition, Colliet's product generator should allow information systems to quickly define software needed to support new business services.

However, Bautz admits that the system has drawbacks — most notably its inability to run in the IBM VM environment. "The closest thing to what we want in branch offices is IBM 9370s running VM," he says, adding that installing an IBM MVS system at branches — some of which may have only 20 or 30 employees — in small countries would be expensive and would require a resident technical expert.

The bank knew of this limitation when it signed the agreement with Colliet. One possible way around the problem would be to "try to centralize processing in centers where there is more of a critical mass of technology talent," Bautz says.

The software solution will be deployed in three U.S. offices for evaluation by the second or third quarter of 1989. While the bank could still decide not to go with Colliet's system, this decision would only be made after a lengthy evaluation process, Bautz points out. ■

MANAGEMENT

TAKING CHARGE

Don Ferruggia

Bad designs beget irate customers



"The computer made a mistake!" Why do these words strike terror into the hearts of otherwise intelligent people? Computers actually make fewer errors than humans, but human errors are usually simple to understand and correct, while computer errors can be a nightmare.

Whose fault is that? Yours. And mine. As designers of computer systems, we put a lot of effort into making systems elegant, user-friendly and efficient, but we usually won't admit that errors sneak in anyway. If we did, we would build in facilities and train people to correct mistakes as quickly as we fix software bugs. Let me illustrate with a story that happened recently when I tried to subscribe to a major computer journal.

I paid for my subscription with a credit card. Magazines started arriving, and I saw from my Visa statement that the subscription had been billed. Soon, however, I began to get dunning letters saying I had not paid; then the magazines stopped coming.

I decided to call the publication to straighten things out, so I examined the latest payment invoice. It had no phone number on it, so I wrote a letter. I was about to address the envelope when I noticed that the address on the invoice was in a different state from the address on the envelope they had enclosed. Its editorial offices were in yet a third state. Not wanting the letter to be lost, I called the editorial office for information. They gave me a toll-free 800 number to call; no one at that number answered.

Monks! Every statement and invoice should have an address and phone number where people can go with questions. Phones should be answered, even if only with a recording.)

I called the editorial office back. By now, I was what is technically known as an "irate customer."

Continued on page 91

IS helps Deere plow forward

CIM adoption, drastic downsizing restore profitability to 150-year-old firm

BY JEAN S. BOZMAN
OF STAFF

MOLINE, Ill. — Deere & Co. sprang to life during the U.S. industrial revolution in 1837. It has spent 150 years since then supplying plowshares and harvesters to the world's farmers.

In the early 1980s, Deere saw its darkest days. That was when inflation forced demand for farm equipment down 70%. And that was when Deere decided to use information systems technology as a lever to restore profitability.

"What happens when the bottom falls out of your business?" Deere Chief Executive Officer Robert A. Hanson recalled at this fall's Autofact show in Chicago. "We were, perhaps, lucky. Instead of the big bang of a crashing market, [most companies] face the slow drip, drip, drip of creeping gradualism. There may be a market share loss here, an upstart Far East competitor there, but not enough to take

concerted, probably unpleasant, action."

As demand fell, Deere had to find a way to regain profitability with a drastically reduced work force — down from a high of 65,000 in 1979 to the present 38,000. In 1987, Deere generated \$4.1 billion in revenue and placed 108th in the Fortune 500 but still lost \$99 million. The \$5.3 billion company returned to profitability in 1988, earning \$315 million.

To increase efficiency, Deere turned to computer-integrated manufacturing (CIM) and standards like Manufacturing Automation Protocol (MAP). It also turned to some experimentation with technologies. "We welcome new methods, new ways of proceeding," Hanson said. "We try them, and we replicate what works."

But Hanson credited a fundamental change in attitude as the factor that saved Deere. "However daunting the hardware, it's the software that is between the ears that is most important," Hanson said. "It's the change in the corporate mind-set that al-

lows you to consider new approaches, to make the changes in processes and people."

Even as the organization downsized, Deere never abandoned its IS philosophy of managing a centralized IBM mainframe resource for use by distributed business centers. It also develops software for use by a plant in Mannheim, West Germany. Today, a central staff of 182, including operations, software and communications personnel, runs Deere's \$50 million-plus IS operation.

"We have a centralized computing utility but decentralized decision-making," said Keith Crawford, manager of computer operations. "We have the economy of scale given by a central site, but we've never scheduled the work that's done on the mainframe."

Deere created its mainframe site in 1968. It now uses two IBM 3090 Model 600Es, a Model 400E and a Model 120. A separate Model 180E is installed in Waterloo, Iowa. The aim is to provide even greater horsepower in coming years while reducing chargeback costs to end users by 5% to 10% a year.

But it is decentralized decision making, backed up by remote personal computers and

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Deere strives for the right technology

Lenders maintains information flow

BY MICHAEL ALEXANDER
OF STAFF

Journalists are a demanding bunch, and nobody knows that better than Jerry Lenders, director of technology at Infomart in Toronto.

He overheard that the company calls an "electronic printing press," an on-line database system that delivers news retrieval and library services to journalists at some of the top newspapers in North America. "It has been said that we are the heart of the organization, and I think that is true," he notes. "If the system is not up, it causes aggravation for everyone, not just the people on-line at the time. Obviously, there is no reverse coming in, so it is crucial that we stay up because that revenue does not get replaced."

The database service, called Infomart Online, also serves as a gateway to Southern News newswire, Dow Jones News/Retrieval service and Datatrust, three on-line systems offering full-text retrieval of newspapers

and other services. Infomart is a division of Southam, Inc., one of Canada's largest publishing organizations.

Lenders also manages an on-line system called Private File Search, a customized database service used by 45 clients who need to store and manage text and numeric data.

Pressing needs

These days, journalists, research librarians, business people and others are turning to electronic services for industry news, market analyses, stock market quotes and other information.

Services such as Infomart can sort out vast amounts of information in a short time, often delivering in minutes research data that would have taken a journalist or research librarian several hours to compile.

The success of an electronic information business hinges on being able to offer subscribers ready, easy access to the information stored in its "electronic warehouses."

"Newspapers don't want any-

PROFILE

Jerry Lenders



Positions Director of Technology, Infomart.

Mistaken: "To learn enough from mistakes to prevent them from happening again."

thing to get in their way," Lenders says.

For Lenders, that means he must make certain that his system can provide more than 1,000 subscribers with instant access virtually 24 hours a day, seven days a week to information published in dozens of daily

newspapers as well as from a variety of other sources.

At the core of the Infomart system is a cluster of four Digital Equipment Corp. VAX minicomputers. Four other VAXs are available for overflow or as backup in the event the first cluster

Continued on page 92



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Deere

FROM PAGE 87

minicomputers, that keeps Deere's IS policy responsive to change. Remote sites use Digital Equipment Corp. VAXs in their factories and Tandem Computers, Inc. computers to track inventory and orders.

Many ideas flow upward from the remote centers, said Dale G. Kennon, manager of telecommunications networks. Part of Deere's 1980s strategy is to listen to those ideas as they bubble up through the organization. "A particular unit might do something, the [information] flow would be into corporate and then corporate would make sure the other units understand," Kennon said. "It's not one-sided. It's a not like corporate has all the answers and goes on to tell the units what to do."

The human factor

Handling new technology sometimes means placing as much emphasis on human issues as on equipment. Deere pays a lot of attention to quality control and to training. "You need to have a consistency of operation," said C. R. Townsend, manager of Deere's computer center here. "Eliminating operator errors, for example, means that you'll be handling the same conditions the same way all the time."

Automation of some IS functions also crept in as Deere rebounded. The operations staff was trimmed from 135 people in 1982 to 78 people now. But each operator has access to more productivity tools than he did six years ago, according to Townsend.

Among these tools are software packages written by Deere's Technical Services group. One is a package called Ultraview, which displays the mainframe resources being used at any moment. The real-time Ultraview color display on overhead monitors points up sudden "spikes" in system use. If the IBM TSO subsystem starts taking up too many computer cycles, operators see the spike and adjust the work load.

In the tape storage area, Tape View, another Deere Technical Services utility, displays system requests for IBM 3480-type cartridges.

Tape drama

Dramatic automation recently came to Deere's tape operation. Several months ago, the firm began installing six Storage Technology Corp. Automated Tape Libraries to replace the rabbit warren of cartridge stacks. So far, two of the library units have been tested — and the entire 25,000-cartridge system should be in production by spring.

Eventually, fewer people will be required to oversee the tape operation. But, Kennon said,

"The push is not to reduce the number of people; it's to drive productivity up."

Despite a healthy interest in IBM's DB2 database management system, Deere is reluctant to replace its time-tested IMS entirely. Instead, a growing number of IMS applications are being copied onto DB2 for study. It is one example of how Deere holds onto proven technology.

"We wrote a homegrown DBMS in the '70s, and we just took it off the last system last year," Crawford noted. "Most of our production applications are running in IMS, and I believe we'll have IMS 15 years from now."

Out in the factories, significant steps have been taken toward installing the MAP standard as a backbone network. But factories still feature VAXs

hooked into DEC's Ethernet, and that will not change soon.

"MAP has improved communications on the factory floor," Kennon observed. "But I don't feel it's a panacea in itself." MAP continues to be deployed, and some factories are evaluating the installation of state-of-the-art MAP 3.0, Crawford said.

State of the art, though, is not the goal at Deere. It was Hanson

who said Deere's approach to technology was to gradually integrate new elements in with the old. "We strive for the right technology, not necessarily state-of-the-art technology," Hanson told his Autofact audience. "The goal is to find what works best for us, whether [it is] old or new technology, or, as is often the case, some combination of both."

Everybody talks OLTP. Tandem does it.

Ferruggia

FROM PAGE 87

toner." They connected me to a manager, who pulled up my information on her screen. She informed me that they had no record of my payment.

(Moral: Give me a break. This is a design problem! One clerk, in order to perform one

logical function, which was to charge my subscription to a credit card, had to perform two discrete operations: recording the charge either manually or through a financial system and updating my subscriber record through a different system. Relying on people to keep systems in sync is asking for trouble. Instead, updating my subscriber record should have automati-

cally kicked off the payment to Visa or vice versa. If this was done, this problem could not have occurred.)
The manager then told me that she believed they could have made the mistake, and said, "Let me tell you what you have to do to settle this."

(Moral: This is a training problem. Remember that I am still an "irate customer." Tell-

ing me that she believes me is nice, but then she throws the problem back into my lap and says it is my responsibility to settle it. It would have made a huge difference if she had said, "Let me tell you what I need from you so I can settle this." If it's your problem, own up to it.)

She then asked me to write her a note and mail her two things: a copy of my credit-card

statement and the mailing label from the last issue I received.

(Moral: It's always better to collect all the information at once and settle problems as quickly as possible. The only information she really needed was the transaction ID number from my statement, which she would then verify with Visa, and she could have asked for that over the phone. The note would only serve as a reminder, and the mailing label would only help her find my record, which she already had on her screen.)

I did send the note and the other material, and my subscription did start coming again. So this story has a happy ending. From it, we can deduce four rules — all of which were broken — to make any system more tolerant to "computer errors":

- Design to avoid human error.
- Always provide an address or phone number for inquiries.
- Train your staff in dealing with irate customers.
- Make quick resolution a priority.

Ferruggia is president of Personal Excellence, Inc., a consulting and training company in Warwick, N.Y.

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JAN 18-19

Enterprise 9-5 Network: Emerging Strategies, Washington, D.C., Jan. 9-10 — Contact: Telecon Publishing Group, Attention: Conference Registrar, P.O. Box 1455, Alexandria, Va. 22313.

Automated Clearinghouse Services in Government Securities, Arlington, Va., Jan. 11 — Contact: MACMA, Suite 640, 1901 L St. N.W., Washington, D.C. 20036.

JAN 15-21

National Retail Merchants Association Annual Convention and Business & Equipment Exposition, New York, N.Y., Jan. 15-18 — Contact: NIMA, 100 W. 31st St., New York, N.Y. 10001.

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Lenders

FROM PAGE 87

crashes. A triple redundancy in the communications links helps insure that the lines stay open.

Some 20G bytes of information, about half of it text from newspapers, is stored on the system's disk farm of 15 drives. Managing the variety of information that must be constantly available at a subscriber's fingertips can be daunting.

"This business has a lack of historical basis as to what users really want: archival information or current information," Lenders says. "My gut feeling is that they only

want to access current information, but we're monitoring it to find out."

Lenders estimates that the database is growing at the rate of about 11M bytes per day. "We recently bought four DEC RASD hard disk drives capable of storing 1.4G bytes each," Lenders says. "Those will last us until May or June of next year."

Maintaining control

Keeping this growth under control is a challenge, he says. "We need to decide what information must be put on-line, what is put on high-speed storage devices and what will not be kept at all," he says.

The newspaper files are backed up every night. "We operate the system for newspaper customers seven days on 22

hours; for others it is seven days on 20 hours," Lenders explains. Though the more demanding newspaper clients are off-line only one hour per night, "we're looking to improve that window," he adds.

Lenders, who majored in computer science at the University of Waterloo in Toronto, began working at Informant as a systems engineering representative (a programmer) in 1981 and two years later, moved up to become a systems engineering manager. In June 1986, he became director of technology with responsibility for the computer operation and its 18 employees (out of a company of 70 employees).

A bit of this, a byte of that

"My job varies a lot of days, and that is what I like about it," Lenders says. "Some days are spent developing new systems, and some days are devoted to problem resolution. I also like the bits and bytes of the job and like to get my hands in when there is a problem."

He says that he is constantly wrestles with providing adequate service at the lowest possible cost to the company and its subscribers. "The bigger challenge is that the technology is changing so rapidly," Lenders says. "That makes it difficult to stay on top of what is cost-effective."

"I am very conscious of the bottom line," he adds. "How do we maximize the bottom line and service availability? That is a fine, tricky line."

Lenders is constantly examining and evaluating new technology that will speed access to stored data as well as trim the amount of time that must be expended backing up the disk farm. Some of the options he is considering are optical disk, both write-once read-many and compact disk/read-only memory, as well as tape backup on thin videotape.

How do you handle catastrophic events, when the system shuts down and subscribers are clamoring for service, he is asked.

"Calmly," Lenders replies. "I don't get razed easily. Even though crisis management is the roughest time that I have, I know how to take it easy when there is a problem."

Since a computer failure can be disastrous if its cause cannot quickly be found and resolved, guarding against that prospect is one of his primary responsibilities, Lenders says.

The first priority is to get the service back up and running smoothly, he says. Only then do data center staffers attempt to track down and fix the problem that crashed the system or caused service to be interrupted.

All for one, and one for all

"We have an all-in-together attitude here, and we methodically resolve problems," he says. "Having self-confidence helps too."

The roughest days are those in which problems occur and it is difficult to determine their cause.

"I don't mind when we make mistakes, but I always make sure that we learn enough from them to prevent them from happening again," he says. "Once is fine as long as we learn from them and plug the holes so that we can go on."

Lenders describes his managerial style as informal. He says that he tries to hire the best people for the job and let them determine how to accomplish their tasks, though he guides them and sets priorities.

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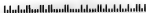
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Welcome and Introduction

Thomas Willmet

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Robert P. Fisher

V.P., Software Research Group & IBM Advisory Service

Strategies for Peripherals & Associated Software

David Williams

Director, Peripherals Research

Strategies for Large Mainframes

Carl Thompson

Director, Systems & Peripherals Technology Service

12:30

Luncheon

Strategies for Microcomputing

Aaron Goldberg

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Nell Margolis

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Years ago, a fact-checker just starting down the road to being a journalist chanced to interview Drexel Burnham's Michael Milken, the (recently beleaguered) head of its high-yield bond department. All went well until the sycophantic journalist asked the nascent Emperor of Junk Bonds a question about — well, junk bonds.

"Don't ever use that term!" he exploded. "Uh — what term should I use?" asked the writer, whose immediate assignment was to fact-check an article on millionaires that must have used the term about, oh, 50 times, conservatively speaking.

Call them high-yield, high-risk debt instruments, said the guru.

The humble fact-checker relayed the news to her editor. "Milken says we can't say 'junk bonds' in the junk bond story," "What does he want us to call them?" asked the editor. "High-yield, high-risk debt instruments," the writer said. The editor laughed so hard he almost choked. Almost. Thank goodness. Otherwise, he too might be investigating possible charges against Milken. The editor told the writer that *Mil-*

Continued on page 38

Brits buy Computer Consoles

BY NELL MARGOLIS
OF STAFF

WALTHAM, Mass. — John F. Cunningham, who took Computer Consoles, Inc. out of the red and into two years of ever-increasing revenue, last week crowned his turnaround achievement with an agreement to sell the company to British computer and communications giant STC PLC for \$168.4 million.

The pending acquisition of all of Computer Consoles' common stock for \$12.80 per share is a sweet deal for Cunningham,

whose million or so shares give him, along with other executives and directors, an approximate 12% stake in the company. Analysts last week agreed that is no more than he deserves.

"There's no question about it," said Karen Payne, an analyst at Bulcher & Singer, Inc. in Philadelphia. "He's done a truly great job." In 1985, Cunningham gave up the presidency of Wang Laboratories, Inc. to take over as chief executive officer of Computer Consoles.

The firm was then a \$112 million company floundering between a communications operation that had been broadened by the breakup of AT&T and a supermini-computer division that had yet to realize on a sizable investment in research and development.

Cunningham "brought in a very, very good management

Continued on page 38

Data View

Merging for market share

Computer Associates' aggressive acquisition activity has bolstered the firm's share in key mainframe software product areas

Accounts payable	1%	10%	Software
Accounts receivable	1%	9%	International
Disk management	29%	50%	Uccel
Graphics	*	10%	Imco
Program testing	*	35%	Capex

* No significant market share at this time

SOURCE: COMPUTER BYTES, LLC

Seagate buffeted

Disk-drive maker lays off 1,000 after \$53M loss

BY JULIE PITTA
OF STAFF

SCOTT'S VALLEY, Calif. — Once the star performer of the disk-drive industry, Seagate Technology has lately looked something less than stellar. On the heels of a \$53 million loss reported for its most recent fiscal quarter, Seagate recently said it has laid off 20% of its domestic work force — 1,000 employees.

According to company officials, the massive layoff affected every department, including senior management. In a prepared statement, Seagate Chairman and Chief Executive Officer Alan Shugart said the reduction was taken to correct "the industry imbalance between production

capacity and market demand."

Julie Skill, a Seagate spokeswoman, said the layoff is one of a number of actions the company has taken to bring production levels more in line with market demand. In August, Seagate reduced its work week from seven to five days. Production of disk drives was cut by about 30% in the period from early summer to the fall.

"Tough all over

However, not all the laid-off employees were in production-related positions, Skill noted. Others were let go to "bring business expenditures down," a step the company hopes will allow it to return to profitability.

Continued on page 39

MCC meets, ponders future

BY JAMES DALY
OF STAFF

AUSTIN, Texas — Members of The Microelectronics and Computer Technology Corp. (MCC) research consortium circled

quality check," MCC Director of Government Affairs Sandy Dowchen said of the high-level pow-

er. MCC Chairman and Chief Operating Officer Grant Dove used the one-day meeting to announce the

shareholder application of MCC's CYC knowledge-based project. The technology will serve as the foundation for Digital Equipment Corp.'s Smer system, an in-house program that pairs computational re-



MCC's Dove

To page 36

Quotes from First Boston confab

BOSTON — The following is a collection of quotes from prominent industry executives and analysts addressing investors at the annual First Boston Corp. Technology Conference last week.

"As *Demon* Europeans said, the race isn't always to the strongest and the swiftest, but that's sure as hell where I'd bet."

Stephen Schwartz, vice-president, IBM

"When there's not enough gas, you drive around with a full tank." Jean-Claude Cornet, vice-president and general manager of Intel Corp.'s microcomputer division, on the buyer stockpiling of 80386s that has caused a dramatic drop in Intel orders

"Intellectual property is one of our major profit centers." Walden C. Rhines, executive vice-president of Texas Instruments, Inc.'s semiconductor division, on TI's royalties from its settlements of DRAM patent suits

"There's plenty of room for three or four or five companies like the two of us — but there are only two of us."

Kenneth G. Fisher, chairman, Encore Computer Corp., on his company and Sequent Computer Systems, Inc.'s presence in the parallel processing market

"We've gotten to the point where we're almost giving away the hardware to accelerate the growth of the software."

Ray Noorda, chairman, Novell, Inc.

"I talk to 5,000 MIS people a year, and I can't figure out where all this interest in Unix is supposed to be."

Marty Gruhn, president, The Sierra Group, Inc.

"We don't really have a backup plan. We don't have that many options, frankly. If we stumble again, we'll have to seek some sort of relationship with a third party."

John Cullinane, chairman, Callnet Software, Inc.

"We've heard all about the end of the mainframe. We don't believe it. It's very competitive in the market, but the demand is there."

E. Joseph Zemke, president and chief operating officer, Amdahl Corp.

MCC meets

CONTINUED FROM PAGE 95

quirements with available systems, Dove said.

MCC also announced plans to license two systems from its Packaging/Interconnect program to outside firms as well as a research agreement on CYC applications with Stanford University's Knowledge Systems Lab.

The MCC gathering at the University of Texas Balcones Research Center also featured addresses by Motorola, Inc. Chairman Robert W. Galvin and former MCC Chairman Bobby R. Inman.

At MCC's inception, observers questioned whether competing companies

could work together successfully or whether the organization would implode in a beehive of bickering and tight-lipped meetings.

Once the group got off the ground, there were still problems. Before Inman resigned in September 1986, MCC was sometimes criticized for its slowness in getting technology to its shareholders and its penchant for delivering a blizzard of paperwork — more than 460 technical reports were released in 1986 — in the face of real-world problems.

That is a feeling Dove has worked hard to break. "There's a high impatience factor in the industry," he said. "We'll still be moving toward the long-term revolutions, but I'm just as interested in spinning things out along the way that you can

WE'LL STILL be moving toward the long-term revolutions, but I'm just as interested in spinning things out along the way that you can hang your hat on."

GRANT DOVE
MCC

hang your hat on."

That move began in June 1987, when NCR Corp. announced the first commercial product using technology developed

by MCC. The release of NCR's Design Advisor, an expert system used to design application-specific integrated circuits, came amid a dazzling display of letters at New York's Hayden Planetarium and expressions of the virtues of cooperative research and development.

Recently, the group has delivered beta-test tools for computer-aided design environments and a high-level software development environment, Dove said.

While Dove admitted that progress has been slow, he contended that it has been steady. "Obviously, there is no room in this business to rest on your laurels," he said. "We're still interested in the long-term revolutions, just as we were at our inception."

The seeds of those revolutions were sown in February 1982, when Control Data Corp. Chairman William Morris invited 18 major U.S. electronics companies and a handful of government agencies to an Orlando, Fla., meeting to discuss the creation of a joint R&D consortium. The Japanese had recently thrown down the high-technology gauntlet by announcing plans to create a fifth-generation intelligent computer system. Six months later, MCC was officially formed.

The charter MCC's ideals were simple but high: Define and initiate major research efforts in the microelectronic and computer fields. But when the plan was hatched, there were questions about whether competing companies could work together successfully. Dove said MCC has kept that barrier in a simple but effective way. "Our success rests on our ability to allow plenty of room for customization and value-added services," he said. "So the companies can take the technologies, add value and take it to the marketplace in a competitive way."

Ironically, the Japanese government's Fifth Generation Computer Project is about to end its second stage, and members of the development team held a symposium recently in Tokyo to reveal their results. The aim of Phase 2, which ran from fiscal 1985 to 1988, was to develop an artificial intelligence subsystem for a computer prototype to be released in a few years.

Dove also said he sees future MCC directions in the field of neural networks, optical technologies and superconductor research as well as dual-use technologies in which government and commercial needs overlap.

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Margolis

CONTINUED FROM PAGE 95

ken's message was, in his opinion, pure high-yield, high-risk debt. Call them junk bonds, he said; if you say anything else, no one will know what you mean.

Even if you call them junk bonds, a lot of folks don't know what you mean. In fact, the current Acquisition-o-rama, brought to us in no small part through the courtesy of junk bonds, is replete with terms that everybody flees around but many don't quite understand:

- **LBO.** Pay no attention to the debate about whether LBO is a late U.S. president from Texas or a cable television channel; both of these are wrong. The initials stand for "leveraged buyout" and mean an acquisition financed almost entirely on debt. Best bet is just to remember three more letters: OPM. This stands for "other people's money" and tells you everything you ever wanted to know about an LBO.

- **Greenmail.** According to a seasoned mergers-and-acquisitions expert, green-

mail occurs "when you pay a potential hostile acquirer a premium over-the-market value of his stock in your company to get him to go away." The potential confusion comes in that the term "blackmail" tends to conjure up the concept of paying money to ensure someone's silence, rather than to get them to go away. Actually, "greenmail" is a lot closer to "protection money." However, "green protection money" seriously lacks jargon potential.

- **Pacman defense.** The practice whereby a reluctant acquisition target gets rid of a would-be hostile acquirer by acquiring it. The name is derived from a fast-moving American game that few play anymore, the action having shifted to fast-moving Japanese games. Any global

market inferences to be drawn? Maybe; maybe not. Are there any jargon inferences to be drawn? Yes; Don't be surprised if you start to hear of a "Nintendo defense."

- **Poison pill.** Corporate provisions — for instance, voting rights or issuance of new stock — adopted by an organization to deter would-be hostile acquirers. Companies that go for poison pills — which, according to the mergers-and-acquisitions expert, often "don't really help a hell of a lot, do they?" — also tend to like golden parachutes, which are extremely lucrative severance packages that are awarded to certain (usually executive) employees departing under specified circumstances — for instance, in the wake of a hostile takeover. (Synonym:

Golden handshake.)

- **Asset player.** A would-be acquirer — corporate or individual — that tends to hunt out companies with undervalued assets. "What the asset player is saying is that the market is valuing your company on its earnings, when it really should be looking at the underlying assets," our expert says. What the asset player is thinking, the expert adds, is that the value of the underlying assets will only be realized if the assets are sold. What the asset player is planning, says the expert, is probably to sell off your company bit by bit.

- **Junk bonds.** High-yield, high-risk debt instruments.

Margolis is a Computerworld senior writer.

Brits buy

CONTINUED FROM PAGE 95

team," Payne said. The team, in turn, rolled up a series of wins, including critical cost cuts and a new strategy based on the coming primacy of Unix, reduced instruction set computing (RISC) and fault-tolerant databases.

Whether the team — and Cunningham himself — will remain in place after the acquisition was unanswered last week.

Acquirer STC itself — with its subsidiary, ICL — represents 25% to 30% of the smaller company's customer base, Butcher & Singer's Payne pointed out. "These companies are very familiar with each other," she said. "They've done business together for a long time." The relationship should minimize the post-merger adjustment period.

Also boding well for users, Payne said, is STC's interest in Computer Consoles' new product activities.

For STC — a \$3.6 billion communications firm — the deal is a strategic triple play that, according to a spokesman, "will... establish STC as a world-scale supplier, broaden its market base and give [it] improved access to, and an important stake in, the North American market."

"Suppose you need to send sales information to 100 people in 100 locations all over the world. You want to do it fast and all at once and you're the only one with a computer.

No problem."

—Mary Ann Evans, AT&T Branch Systems Manager



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Seagate

CONTINUED FROM PAGE 95

The recent reduction in work force is the second significant layoff in the company's history. In 1984, Seagate terminated 700 employees when it moved its manufacturing operations to Singapore. Still said the Singapore plant has not been affected by the layoff.

Industry watchers said Seagate must do more than merely trim expenses to bring the company back on track. David Vellante, director of storage research at International Data Corp., said Seagate misread the shift in demand from 5¼- to 3½-in. disk drives among personal computer makers.

"Seagate was attracted to that very profitable 5¼-in. business," Vellante commented. "Seagate misread IBM's need for 5¼-in. disk drives as well as the demand for 5¼-in. disk drives in general."

Missed the shift

A longtime supplier to IBM, Seagate sold 44M-byte 5¼-in. disk drives to IBM for its Personal Systems/2 line of microcomputers, introduced in May.

However, IBM and other microcomputer manufacturers, including Compaq Computer Corp., have equipped many of their newer PCs with sleeker 3½-in. disk drives.

Seagate has been behind other disk-drive suppliers in bringing 3½-in. drives

to market. Last quarter, Seagate reported the \$52 million loss, which was its first ever. An estimated \$35 million of that loss is attributed to a write-down in obsolete disk-drive components.

Like other drive manufacturers, Seagate has suffered from the ability of systems manufacturers to produce their own disk drives. IBM is now considered among the leading manufacturers of 3½-in. drives.

Vellante said Seagate is likely to overcome its troubles by landing OEM orders for 3½-in. disk drives, now becoming available in volume. Seagate's strength has been its manufacturing might, which allows it to build disk drives at traditionally lower costs than its smaller competitors.

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IN BRIEF

Countersuit

Information Consulting, the information systems company launched in October by seven former Arthur Andersen & Co. consultants, last week filed off a countersuit against Andersen. The countersuit alleged that the accounting giant's action is an attempt to damage the fledgling Information Consulting by scaring off putative employees and clients.

Encore in black

Encore Computer Corp. reported the first profitable year in its brief but tumultuous history. The Marlboro, Mass.-based maker of parallel processors posted an operating profit of \$1.1 million, or 5 cents per share, on revenues that more than doubled from fiscal 1987 to \$34.4 million. In the prior year, the start-up lost \$5.9 million, or 27 cents per share.

Northern Telecom restructures

Northern Telecom's board of directors last week approved a fourth-quarter provision of up to \$200 million to fund a reorganization scheduled to begin in early 1989. The restructuring, according to Chairman Edmund B. Fitzgerald, will include a streamlining of marketing functions and plant closings as well as consolidations.

Apple exec eases back

Cling health and personal reasons, Apple Computer, Inc. Vice-President and Chief Financial Officer Deborah A. Coleman announced plans to scale back her responsibilities at the Cupertino, Calif.-based firm. Following a five-month leave of absence beginning in February, she will return to Apple as vice-president of tax and treasury.

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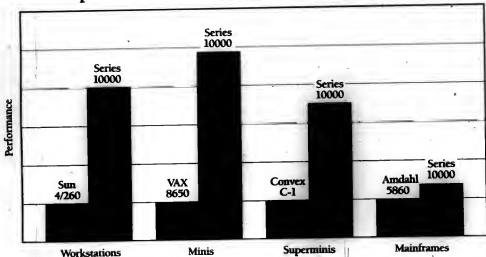
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COMPUTER CAREERS

Staking out systems integration

Big Eight accountants' consulting branches spend heavily for recruits

BY RICHARD PASTORE
STAFF



Corporations are turning to systems integrators to take on a rapidly growing share of their MIS work load. Already an \$8 billion market, systems integration is projected to soar 20% to 25% annually into the 1990s. The Big Eight accounting firms are scrambling to share in this bounty and searching high and low to expand their stable of consultants and professionals.

Arthur Andersen & Co., by far the leader in MIS consulting and systems integration among the Big Eight, generated 36% of its \$2.32 billion revenue in 1987 from this market. The firm is also the most ambitious college recruiter, plucking 80% to 90% of its systems integration consulting staff from campuses, says Paul Cosgrave, deputy managing director of Arthur Andersen's consulting practice in New York.

In the past year, however, Arthur Andersen selected 200 of its 2,000 new MIS consultants from the ranks of experienced professionals, Cosgrave estimates. Most of these specialists in local-area networks, workstation and vertical industries. Generally, even these experi-

enced systems integration consultants must join the corporate ladder below the managerial ranks, but their salaries are often as much as \$60,000.

Michael Sullivan, director of recruiting for management information consulting at Arthur Andersen, explains that it has been the firm's philosophy that "proper treatment and development really starts at the entry level. It's more difficult to assimilate people who have had experience at other firms."

Pragmatists wanted

Big Eight firms Arthur Young takes the opposite tack when it comes to recruiting. "We look for people with four years of recruiting for management information systems with heavy technical background as compared with consulting skills," says John Sifonis, Arthur Young's national director of strategic management consulting.

The three main wells of talent that Arthur Young plumbs for its systems integration professionals are vendors, competing consulting firms and corporate in-house integration staffs. People hired at the managerial level can earn from \$65,000 to \$75,000, depending on area of expertise and location, with Dallas representing the lower range and New York the upper.

Between these two hiring extremes falls Coopers & Lybrand. According to George Van Ness, a partner at the firm's national information technology services, the expanding systems integration market has made it necessary for Coopers & Lybrand to recruit at all levels of experience from industry, vendors and competitors. Systems integration

has left the supply far behind. "It's terrible," Sifonis says. "There really is a shortage of people. I've talked with colleagues at other Big Eight firms and it's true — you can't find enough good people."

Retaining consultants is also a problem for some Big Eight firms. Senior Big Eight consultants have become frustrated with regulatory restrictions on their involvement with their firms' auditing clients as well as a lack of compensation and influence to match the proportion of revenue they generate. These

advantage [over their non-constant competitors] in terms of perception," Kugel says. "That's how we're viewed by the corporate leaders as already having an understanding of their businesses. They also have a relationship with the boardroom people, who are the ones that sign off on integration projects."

On the horizon

Specific areas within systems integration that promise future growth are computer-integrated manufacturing, image technology and voice technology, Cosgrave predicts. According to Van Ness, there will be horizontal movements in artificial intelligence and expert systems.

What strategy should the systems integration consulting candidate forge for this future? Van Ness advises specialization: "What I've seen in the last five years and expect to see over the next five is a decline in the role of the generalist and an increase in the role of the leading experts in a specific discipline."

At the same time, Van Ness and others acknowledge the advantage of some familiarity with a variety of disciplines. "A systems integration consultant is the kind of person who must wear many hats," Kugel says. Because the partners and managers are not always the same, the consultants are packages to clients, "the consultant even has to be a good salesperson," she adds.

Pastore is a Computerworld copy editor.

"I'VE TALKED with my colleagues at other Big Eight firms and it's true — you can't find enough good people."

JOHN SIFONIS
ARTHUR YOUNG

consultant's salaries at Coopers & Lybrand range from the upper \$20,000s to six figures.

Successful candidates, Van Ness says, should be able to understand the functional problems of a particular industry such as health care or manufacturing, implement technology from concept through the life cycle and plan and lead a large-scale project. "Of course, not everyone has all of these skills," he says. "We start them out in two dimensions and teach them more as they grow."

The skyrocketing demand for systems integration consultants

bones of contention have been the main cause of a growing rate of high-level turnover.

The future of the systems integration market looks bright as increasingly complicated technology impels more businesses to seek outside help for integration. Systems integration consulting candidates should also note that Big Eight firms are well-positioned to reap the rewards, according to Karen Kugel, director of systems integration services at International Data Corp. in Framingham, Mass.

"The Big Eight firms have as

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COLUMN WIDTHS AND MINIMUM DEPTHS: Your ad can be one of seven different widths. There is a minimum depth requirement for each width. You can also run larger ads in half-inch increments. The chart below can serve as a reference.

NUMBER OF COLUMNS	WIDTH	MINIMUM DEPTHS
1 column	1-1/4"	2"
2 columns	2-5/8"	2"
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5 columns	6-15/16"	5"
6 columns	8-3/8"	6"
7 columns	9-3/4"	7"

RATES: Your rate will depend on the size of your ad and whether you choose to run regional, by or nationally. The national rate is \$12.60 per line or \$176.40 per column inch. The regional rate (Eastern, Midwestern or Western editions) is \$8.00 per line or \$112 per column inch. You can run your ad in any two regions for \$10.60 per

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The minimum ad size is two column inches (1-1/4" wide by 2" deep) and costs \$352.80 if run nationally. A sample of this size appears below. You can run larger ads in half-inch increments at \$88.20 per half inch. Box numbers are available and cost \$25 per insertion (\$50 if foreign).

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SAMPLE AD SIZES AND PRICES: To assist you in planning your recruitment advertising, the following shows common ad sizes and their respective costs.

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2 columns x 2"	\$ 448.00	\$ 593.60	\$ 705.60
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— Cesar Namba
Imperial Corporation of America

Cesar Namba is Assistant Vice President for MIS Recruitment at Imperial Corporation of America (ICA) in San Diego, California. ICA is a financial services organization that has savings and mortgage institutions in 20 states. For Cesar, filling important MIS/DP positions is the name of the game. Recently, ICA embarked upon a change in part of its corporate technology, and that meant that Cesar had to go to work finding qualified personnel. And for reaching the best possible candidates, he turned to *Computerworld*.

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MARKETPLACE

Navigating network price wars

Discounts on new systems disrupt market for used communications gear

BY DAVID GABEL
SPECIAL TO COM

You could go out and buy an entire used communications system, but you may not want to. When it comes to this equipment, the bulk of the market is in parts rather than systems. In fact, parts generate about 80% of the revenue for dealers of used communications equipment, says Jonathan L. Rogers, leasing analyst at market research firm International Data Corp. in Framingham, Mass.

There are a couple of reasons for this situation. One is that, compared with their counterparts in the used computer market, potential buyers of used digital telephone systems, private branch exchanges, multiplexers, modems and similar gear seem to harbor greater reservations about whether the products will be reliable. This perception persists even though many companies that have bought used equipment have gotten decades of use out of it.

"Most people can't comprehend that a 5- or 10-year-old

part is as good as a new one," asserts David Potter, president and chief executive officer of Source, Inc. in Richardson, Texas, a leading used communications equipment dealer. Much communications equipment is designed and engineered to last for far longer — as long as 40 years — so "it really is a viable alternative," Potter claims.

New equipment discounts
Perhaps the chief reason for the predominance of the parts business within the used communications market stems from discounting by vendors of new gear. Since AT&T's divestiture, makers of communications equipment have battled over market share, driving down prices of new equipment. Consequently, buyers see little incentive to purchase used products.

There is at least one other factor at work here. "The used telecommunications market is a little different from the used computer market," Rogers says. Communications equipment that finds its way into the used market is not likely to be deployed in

its original configuration, he says. "This causes a lot of selling and buying between brokers. So most of the revenue that a used telecommunications dealer gets comes from sales of parts, not systems," he says.

Given the potential drawbacks in buying used communications equipment, one might wonder how dealers and brokers

equipment market, products made by four major vendors predominate — AT&T, IBM's Rolm division, Northern Telecom, Inc. and NEC Corp. These vendors represent the bulk of the installed base of telecommunications equipment in the U.S.

Buyer concerns

Dealers of used communications equipment are constantly fighting to clear up concerns that buyers harbor in addition to reliability and the low prices of new equipment. One of the buyers'

"But if the customer calls with a bad board, that dealer may not be able to fix the problem," Silverman says.

Reliable source

Many dealers, on the other hand, maintain an inventory of parts for systems they sell, as well as their own service crew. Many also belong to the National Telecommunications Dealers Association, based in Washington, D.C., which maintains a code of ethics for members. Buyers can take a first step toward assessing the reliability of a dealer by checking with the organization. Securing references from the dealer's previous customers can also be an important step.

A final concern for buyers is whether they are paying a fair price for used equipment. There is no blue book of prices as there is for used small computers, so purchasers must shop around.

Potter describes one buyer who bought a telecommunications system for \$750 per phone set, while another buyer bought an identical system for \$250. "It's not a good idea to assume that you're getting the best price," he says.

Gabel is a free-lance writer and former data center manager based in Northport, N.Y.

"IF THE customer calls with a bad board, that dealer may not be able to fix the problem."

DAN SILVERMAN
COMDISCO

make a living in the business. Rogers says they do so chiefly through the ability to deliver parts and systems quickly. If a user needs a system or if a third-party service organization needs a part and the OEM cannot deliver it when required, chances are a used equipment dealer can fill the bill, he says.

In the used communications

concerns is how to tell which dealers are reputable.

"The biggest pitfall is the dealer," says Dan Silverman, director of telecommunications at Comdisco, Inc. in Rolling Meadows, Ill. Many dealers, he says, are what are known as "turn-overs" — middlemen that locate equipment and arrange for it to be shipped to the customer.

The BoCoEx index on used computers

Closing prices report for the week ending Dec. 2, 1986.

	Closing index	Recent High	Recent Low
IBM PC Model 076	\$650	\$900	\$400
XT Model 086	\$1,125	\$1,250	\$900
XT Model 090	\$1,300	\$1,575	\$1,050
AT Model 099	\$2,050	\$2,400	\$1,700
AT Model 330	\$2,300	\$2,900	\$1,800
AT Model 330	\$2,350	\$3,600	\$2,425
PS/2 Model 30	\$1,650	\$1,700	\$1,300
PS/2 Model 50	\$2,425	\$2,600	\$1,900
Compaq Portable I	\$750	\$975	\$450
Portable II	\$2,750	\$2,900	\$1,600
Portable III	\$2,600	\$2,550	\$2,550
Portable 386	\$1,750	\$2,400	\$1,675
Plan	\$1,100	\$1,250	\$800
Dynalene 30-300s	\$1,260	\$1,500	\$850
Dynalene 300	\$2,400	\$3,150	\$1,800
Dynalene 386	\$4,225	\$6,100	\$4,100
Apple Macintosh 512	\$750	\$950	\$550
512SE	\$900	\$1,025	\$400
Plan	\$1,150	\$1,225	\$950
Plan 30-300s	\$1,400	\$1,650	\$1,275
SE	\$2,000	\$1,900	\$1,700
SE 30-300s	\$2,575	\$2,675	\$1,800
II	\$3,300	\$3,500	\$2,575
NBC Multisync	\$775	\$900	\$225
Thinkline T8100	\$4,275	\$4,800	\$4,300

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A copy of the RFP will be submitted to the Theta A&M University System. The RFP will be submitted to the Theta A&M University System. The RFP will be submitted to the Theta A&M University System. The RFP will be submitted to the Theta A&M University System.

The City of Long Beach is considering the purchase of a human resource information system. The system will be installed in a college, university, or government environment with a total of \$100,000 or more.

On-line, real time DB2 processing point to be full production. Micro-mainframe links. In beta and/or operation with five or more users.

Charged to the account in a formal request for proposal. For information contact Steve Schaefer, 200 N. Grand Street, Long Beach, CA 90801, 213-355-0801.

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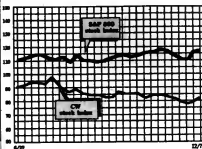
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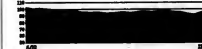
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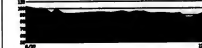


<i>Index</i>	<i>Last Week</i>	<i>This Week</i>
Communications	95.9	98.0
Computer Systems	90.8	95.5
Software & DP Services	99.2	103.9
Semiconductors	51.6	54.0
Peripherals & Subsystems	75.1	78.8
Leasing Companies	103.8	105.2
Composite Index	79.9	82.9
S&P 500 Index	115.5	117.4

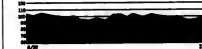
Communications



Computer Systems



Software and DP Services





Peripherals and Subsystems



Leading Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, DEC. 7, 1994

ED-WEEK NUMBER (1)	PRICE				WEEK PCT CHANGE	WEEK PCT CHANGE
	CLOSE DEC. 7 1988	WEEK NET CHANGE	WEEK PCT CHANGE	WEEK PCT CHANGE		
STERLING SOFTWARE INC	8	8	3.75	8.4	7.8	
SUNGARD DATA SYS INC	30	32	18.0	0.8	3.3	
SYSTEMATICS INC	34	36	28.75	0.8	6.8	
SVS. SOFT INC	28	9	24.875	1.1	4.7	
UNICOMWARE INC	18	7	19.875	1.8	8.8	

Communications and Network Services

[illegible]

Semiconductors

N	ADY MICRO DEVICES INC	17	7	7.8	0.0	0.0
H	ANALOG DEVICES INC	29	8	11.29	0.8	0.8
E	ANALOGIC CORP	8	0	7.875	1.4	21.7
C	ANALOGIC CORP	2	0	11.0	0.0	0.0
O	ANALOGIC CORP	17	10	21.29	0.8	3.1
C	ANALOGIC CORP	34	7	6.8	0.4	4.7
O	ANALOGIC CORP	20	0	15.375	-0.1	40.8
C	ANALOGIC CORP	55	30	40.29	2.8	7.0
O	ANALOGIC CORP	10	0	8.875	0.0	0.0
N	ANALOGIC CORP	40	20	11.0	0.8	0.8
	ANALOGIC CORP	60	20	11.0	0.8	0.8

Peripheral

ALCOY CORP	8	2	2,875	0.5	0.6
AMT INC	8	3	4.75	-0.1	-0.3
AMT BOND	11	7	10.00	0.0	0.0
AUTO TROL TRENCO	6	3	3,875	0.0	0.0
BANCIET INC	13	6	3,875	-0.1	-1.3
CORNER DATA MODE INC	12	6	3,875	-0.1	-1.3
DOORTECHNICS CORP	4	2	2.5	-0.1	-0.4
FORNEY CORP	9	5	7,275	0.0	0.0
IMPAKCO INC	12	9	11.75	0.0	0.0
INTEGRAL INC	12	9	11.75	0.0	0.0
LEATMAN CORP	30	30	46.25	1.2	2.3
M & C CORP MASS	19	4	4.25	-0.1	-2.0
MOORE CORP	10	7	10.75	0.0	0.0
WYSE & SUTHERLAND	28	12	18.0	1.0	1.9
GOIT CORP	10	7	10.75	0.0	0.0
INTERAL INC	21	9	7.75	0.0	0.0
CONTEG CORP	3	1	3.125	-0.1	-3.0
LEF DATA CORP	3	1	3.125	-0.1	-3.0
ROBERTS SYS CORP	3	1	3.125	-0.1	-3.0
MAI CORP	7	7	7.875	0.0	0.0
MICROFILMS CORP	30	30	40	0.0	0.0
MICROFILMS CORP	30	30	40	0.0	0.0
SCOTT MATHS MFG CO	60	60	60.375	2.0	3.1

Computer Systems

[illegible]

Leasing Companies

AMPLICON INC	18	7	15.75	-0.2	-1
CAPITAL ASSOCIATES INTER					
INTERNAL INC	7	4	8.75	0.5	0
COMMERCE INC	35	10	21.375	0.8	2
CONFIDENTIAL INVEST SYS	6	2	2.88	0.4	10
LDI CORPORATION	14	9	12	-0.8	0
PRESENER AMERICA INC			3.188	-0.5	-13
	6	3	9	-0.3	0

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Ho-ho-hum

Little action seen in the industry despite the hustle-bustle season

Earlier signs of Christmas spirit notwithstanding, technology stocks last week evoked more "ho-hum" than "ho-ho-ho."

Apple Computer, Inc., Microsoft Corp. and Ashton-Tate Corp., which led what looked like a possible upturn in the beleaguered tech sector, veered toward the "bah, humbug" direction: Apple closed Thursday at 39%, down ¾; Microsoft dropped ¾ of a point to close at 49; and Ashton-Tate underwent an identical drop to close at 22. Digital Equipment Corp. closed at 94%, down ½ of a point from 95¼ at the week's start.

In brighter news, Sun Microsystems, Inc. continued upward, gaining a point to close at 30%. Justifying industry analysts' assessments of a strong local-area network market, 3Com Corp. picked up an additional 1/4 point to end the week at 22 1/4%. IBM closed up 1/4 of a point at 119 1/4%.

As Prime Computer, Inc. continued to resist the advances of MAI Basic Four, Inc., MAI dropped $\frac{1}{4}$ of a point to 8% and Prime rose the same amount to close at 17 $\frac{1}{4}$ %.

Computer Consoles, Inc., ending its first week as an acquiree of British giant STC PLC, closed Thursday at 12 3/4, up 4 1/4 points.

NELL MARGOLIS

Internet sites gird for hacker attacks

BY MICHAEL ALEXANDER
OF STAFF

Officials at research centers, universities, military installations and other sites are scrambling to blunt what many experts believe is the beginning of a major assault on the nationwide Internet computer network.

A rash of break-ins following last month's worm incident prompted the U.S. Department of Defense last week to initiate security measures that some computer scientists and security experts said were long overdue.

The Defense Advanced Research Projects Agency announced that it had established a Computer Emergency Response Team that has been charged with assisting researchers on the Internet network in responding to emergencies such as the

worm program.

The agency said it is gathering a team of 100 experts who will be called on when needed and is establishing a center for communications that will be based at the Software Engineering Institute at Carnegie-Mellon University in Pittsburgh.

Recent breaches

In the month since the Internet worm attack, computer researchers at two sites have reported several instances in which their computer security systems were breached.

Internet, sometimes described as a network of networks, consists of some 1,200 networks nationwide that link computers operated by defense contractors, universities and other institutions. Among the largest networks on Internet are

the National Science Foundation's NSFnet and the Defense Department's Arpanet and Milnet.

While the latest break-ins have not caused any damage, researchers are alarmed because many feel the battle to defend their systems against unauthorized intrusion has only just begun.

Last week, computer scientists at the University of California Lawrence Livermore National Laboratories in Livermore, Calif., discovered that an unidentified hacker had been rummaging through its computer files. The intruder managed to penetrate five computers over a period lasting more than two weeks before he was finally locked out of the system (see story below).

An unidentified intruder penetrated a Digital Equipment Corp. VAX at Mitre Corp., a defense contractor based in Bedford, Mass., at least four times in November [CW, Dec. 5]. No files were tampered with, but the break-in prompted the Defense Department to sever connections

Morris case creeps along

Robert T. Morris Jr., the alleged author of a worm program that knocked out 6,200 computers on Internet last month, continued to be low last week while a federal grand jury in Syracuse, N.Y., looked into the incident.

Three witnesses have testified before the grand jury in recent weeks, said Thomas Guidoiboni, a Washington, D.C., attorney retained by Morris. "We know that they have subpoenaed documents and executed search warrants, but beyond that, we can only speculate on what they are investigating," he said.

Guidoiboni guessed that the grand jury may take two to three months to decide what charges — if any — to bring against his client.

"It's no surprise that they are investigating him, but the ball is in their court," Guidoiboni said. "Our present posture is not to say anything."

In the interim, the attorney said, he is learning all that he can about computers in order to prepare for his client's defense if needed. "Morris is educating me," he added.

MICHAEL ALEXANDER

tions between Milnet and Internet for two days while the system's security was beefed up.

The number of break-ins is likely to accelerate, said Bob Campbell, president of Advanced Information Management, Inc., a computer security firm in Woodbridge, Va.

Copycat hackers, some of whom have been studying the coding techniques used in the Internet worm program, have been inspired to emulate Robert T. Morris Jr., the graduate student suspected of perpetrating the worm, Campbell said. "They are thirsting over the code."

"The recent break-ins are not just more attuned to it," said Rick Rashid, associate professor of computer science at Carnegie-Mellon.

While many computer researchers fret that hackers will be inspired to demonstrate their technical prowess by cracking supposedly fortified systems, others are slow to take the necessary preventive measures.

Several of the flaws in Unix that have been used to penetrate the system are well known to computer scientists, but not all

sites have applied the software patches to fix the bugs. Also, many sites remain content to rely on the good nature of Internet users not to abuse the system, Campbell said.

Uh-oh

But last week, a West German computer operator sent out a warning on Usenet, an informal bulletin board network under the Internet umbrella, warning of the existence of a Unix loophole that makes it possible for even tyros to penetrate computers on the network.

"The bug is not new but was assumed to have been fixed," said David Fielder, editor of *Uniqua*, a journal for Unix system operators published by Info-pot Systems in Rescue, Calif.

While regrettable, the break-in has galvanized the system administrators to boost the security of their systems, said John McAfee, chairman of the Computer Virus Industry Association, which is based in Santa Clara, Calif.

"They have shown the world that Internet is vulnerable to attack and not as secure as people would like," he said.

Quoth the hacker, 'Livermore'

Computer researchers at the University of California Lawrence Livermore National Laboratories said last week that an unidentified hacker broke into five computers at the research center but did not tamper with data files.

"The hacker created a password and account for himself, looked at some system files and looked to see what other computers the host computer communicated with to see how to get to elsewhere from here," said Chuck Cole, deputy security manager at Livermore.

The security breach is the latest of several that have occurred on Internet, a nationwide network linking computers at defense research centers, universities and other institutions in recent weeks (see story above).

"It was not the same kind of attack, and we don't suspect that they are related," Cole said. The hackers may have been motivated to attack

for the glamour of doing it, he added. "The intruder looked at system program logs, presumably to hide his entry, but that wasn't done well," Cole explained.

The break-in was discovered by an assistant programmer who spotted a user name that he did not recognize, Cole said. "He alerted the system manager, who looked through the records and discovered the new user was created by an unauthorized user."

The lab left two computers unsecured as bait in an unsuccessful bid to identify the intruder.

Cole said that the first break-in happened Nov. 22; the last happened Dec. 3. The intruder entered the Livermore systems by means of a computer at Stanford University in Stanford, Calif., and Washington State University in Pullman, Wash., in an attempt to cover his trail, Cole reported.

MICHAEL ALEXANDER

Perot warns against U.S. complacency

BY AMY CORTESE
AND ALAN RYAN
OF STAFF

CAMBRIDGE, Mass. — H. Ross Perot, the dynamic chairman of Perot Systems Corp., issued a call last week for U.S. industry to wake up and start competing again.

In his keynote speech at a Decision Support Technology, Inc. conference held here last week, Perot assailed U.S. industry for allowing itself to become complacent and arrogant after World War II, when all the world bought its products "because they were the only ones" and the U.S. produced 40% of the

world's goods. But today, with a huge trade deficit, the U.S. is the world's largest debtor nation and no longer produces the world's best products, he said.

In the meantime, Japan, rising from the ashes of World War II, has shown itself to be a major industrial power, and "Made in Japan" is no longer associated with low-quality goods, Perot said.

The former Electronic Data Systems Corp. chief is zealous in his belief that the Japanese are gaining control of the U.S. economy. He said Japan makes the best products, the U.S. buys them, the money goes into Japanese banks and then Japan lends the money back to the U.S.



H. Ross Perot

Perot told the information systems executives at the conference that in a world "diseased with being just good enough, the

only thing that matters is to be the best in everything you do." Perot, who spoke at the Harvard Business School later that afternoon, criticized the U.S. education system, saying that the U.S. spends \$328 billion a year on education, "but we have the highest rate of functional illiteracy in the industrialized world."

'Quick buck'

Perot added that "our best and brightest are going into things that make a quick buck," although there are some exceptions. He praised Steve Jobs, founder of Next, Inc., — in which Perot has invested \$20 million — for his dedication to quality and innovation.

Perot attributed Japan's success to the U.S.' decline to the

old adage that from adversity comes strength and from success comes complacency and arrogance. Perot said he foresees the U.S. heading into events that will force it to be strong. "If the Japanese stop funding our debt, inflation will go up and up," he said.

The patriotic Perot, who once organized a Rambo-style reaction to the EDS employees being held by Iranian revolutionaries, said the first thing Americans can do to remedy the country's weakened position is to start creating things that make the country strong. "We can't continue fighting amongst ourselves" over religious and racial differences, he said. "We are all in this together, and we will win or lose together."

Going the IBM route

Thomas Walts considered two major options when planning a revamp of Metropolitan Life's remote data entry operations. In the end, Walts and Daniel Flood, an information systems specialist in the New York home office, had no trouble warming up to Plan B, as in Big Blue.

What IBM proposed was a unique adaptation of its standard Token-Ring network, which typically involves intelligent workstations—that is, personal computers—attached to a file server.

The alternative, channel extenders, was rejected primarily because it involved stringing costly 1.5M bit/sec. T1 lines between the Greenville, S.C., computer center and the remote sites, Walts said. "It far outweighed the cost of two 56K-bit lines," he said.

Moreover, this solution would have required channel extension-type nodes at the remote sites—which were de-

termined to be more expensive on a per-unit basis than the IBM 3720 communications processors that were eventually installed—and back at the computer center. This was not required under the IBM solution, which uses an existing 3725 instead.

Degradation

At the time, the remote sites were using dumb CRTs—3178s and 3179s—tied to IBM's 3274 cluster controllers, which could support a maximum of 14 terminals before serious response-time degradation set in, Walts said.

For example, boosting the number of CRTs to 20 would result in average response times of 3 to 4.5 seconds. The 3274s were connected to a data compression box that could support up to three modem-sharing devices. The latter linked up to a 3090 host at the computer center via dedicated leased lines operating at a speed of 14.4K bit/sec.

Metropolitan Life took a conservative approach to testing the IBM proposal, launching a pilot in December 1987.

A test network was first set up within the computer center to familiarize Walts and his colleagues with the new equipment. Flood and his staff developed the required software.

From there, the pilot moved out into one remote site, where the configuration was slowly expanded to four cluster controllers supporting 128 terminals. Response time dropped to 0.9 to 1.1 seconds.

Today, the revamped network looks like this: In a cascading configuration, the 3274s were replaced with 3174 Model 3R controller units, which handle up to 32 CRTs each. The 3174s were linked via shielded twisted-pair cable to an IBM 8228 multistation switch, which in turn is connected back to a 3725 back at the remote site.

A Token-Ring interface Coupler situated on the 3720

Turning up the volume

Metropolitan Life's Token-Ring implementation cuts response time by almost half

Equipment	Terminals	Terminals
	3274 cluster controller, data compression device, modem-sharing device	3174 cluster controller, 8228 multistation switch, 3720 communication processor, Token-Ring interface Coupler
Transaction volume	2 million transactions/day with average response time of 2.5 sec.	2.6 million transactions/day; four converted sites generate 1 million transactions/day with average response time of 1.3 to 1.4 sec.
Transaction speed	14.4K bit/sec.	56K bit/sec.

SOURCE: METROPOLITAN LIFE INSURANCE CO., NEW YORK

allows conversation between the cluster controllers and CRTs over the Token-Ring protocol.

The 3720s are connected back to the host site over two 56K bit/sec. dedicated leased lines per site to a 3725 back at the host site.

Under the old system, additional overhead was created by

forcing the 3725 back at the host site to poll each CRT device linked to those circuits, creating a lot of unnecessary traffic up and down the line. In the new environment, the intelligent 3720 back at the remote site handles polling activities, allowing the lines to carry data more efficiently.

PATRICIA KEEFE

Met

FROM PAGE 1

to fix what was broken.

"We tend to encourage people with the ability to use a lot of entrepreneurship to try things," said Daniel Cavanaugh, a senior vice-president responsible for all Met Life's data processing and telecommunications facilities and services.

There was nothing particularly wrong with the previous state of the company's remote computing operations. Claims approvers were eking out an average response time of 2.5 seconds for more than two million transactions per day. This might have encouraged some MIS managers to sing, "Don't worry, be happy," all the way to the data bank. But not at Met Life.

"We are constantly looking for ways to improve response time," said David Zimmerman, a

vice-president and staff controller for the firm's remote sites.

The company's data entry operations have been in a better place since hooked up to the Token-Ring. It operates a lot faster," Zimmerman said. Also very real are the cost savings, which so far amount to more than just peanuts—\$16,000 a month in leased-line costs alone. Some of these savings have been used to offset the cost of the new equipment. Additionally, where Greenville used to communicate with 50 remote cluster controllers, it now deals with just 20.

"You hear people in the re-



Met Life's Cavanaugh

mot offices talking about the 'fast machines.' It's actually the same physical terminal as before, but once hooked up to the Token-Ring, it operates a lot faster," Zimmerman said.

Also very real are the cost savings, which so far amount to more than just peanuts—\$16,000 a month in leased-line costs alone. Some of these savings have been used to offset the cost of the new equipment. Additionally, where Greenville used to communicate with 50 remote cluster controllers, it now deals with just 20.

What Met Life did was draw up a plan targeting the 10 heaviest volume-producers among its 50 remote data entry sites. "We estimated the cost of the new hardware [for] the 10 offices at \$1.7 million, with a payback period of 31 months," Walts said. All 10 offices will be converted by the end of 1989. Over a five-year period, he is projecting sav-

ings of \$900,000.

Current plans are to limit the conversions to just these 10 sites. It was determined that there was not sufficient volume of transactions emanating from the other sites to cost-justify in-

clusion in the project. However, Met Life is looking into putting some "mini" standard Token-Ring into some of the smaller remote sites to support activities such as local printer sharing, Zimmerman said.

The weekend pit stop

If an average system response time of 1.4 seconds doesn't impress you, perhaps a track record of successfully converting four remote sites—in less than 48 hours, with no disruption of services—will.

Thomas Walts, manager of Metropolitan Life's Greenville, S.C., computer center, credits cooperative planning with virtually pain-free rollovers to a remote IBM Token-Ring system.

Metropolitan Life's remote data entry centers operate nonstop from 6:00 a.m. Monday to 4:00 p.m. Saturday. That leaves a mere 38 hours to execute a complete system change-over—with no room for error.

"We go out to the offices and get them grumped long before we ever get my equipment delivered," Walts said. During the preconversion risk, an installation team determines where new equipment and circuit terminations will be located and what changes will be needed to facilitate the conversion.

To prevent any unpleasant surprises, a test run is made by setting up a control model in the computer data center. Once everything is powered up, the computer center remotely dials into the IBM 3720 at the remote site, configures it and downloads an internally built Network Control Program into the box. The Network Control Program software controls the 3720 and connected devices.

"Now comes the weekend," Walts said. An installation team, made up of computer center personnel and home office data communications staff, disconnects the console cable from all old control units, attaching them to replacement computers.

On Sunday, the computer center brings up the new system, activates the remote devices and tests every application.

On that first Monday, the team remains on-site. From the user perspective, nothing has changed. "They sign on as usual, and their screens remain the same," Walts said. The only visible difference, he noted, is a much faster response time.

PATRICIA KEEFE

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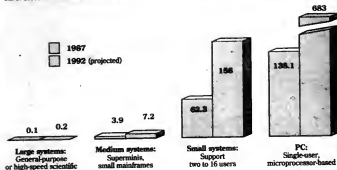
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TRENDS

Unix

Small systems, PCs are the most popular platforms

U.S. UNIX SYSTEM SHIPMENTS IN THOUSANDS



Unix-based systems will be one of the fastest growing segments of the industry in the next five years. International Data Corp. (IDC), a Framingham, Mass.-based research firm, predicted that shipments of Unix-based systems should grow at twice the rate of all computer systems combined.

Unix systems will not grow the same across the board, however. IDC pointed out that Unix is not a market unto itself but is a feature of a range of systems bought for different reasons. Personal computers and small systems will experience dramatic growth during the next five years, while medium-size and large systems will inch ahead.

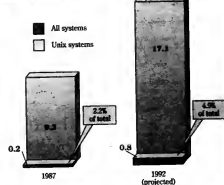
Shipments of Unix systems as a whole by 1992 will be four times greater than they were in 1987, according to IDC. Last year, Unix systems accounted for only 2.2% of all computer shipments, but that is expected to grow to nearly 5% of all computer systems shipped by 1992. Unix systems will grow from \$4.46 billion, or nearly 10% of all computer systems sold in 1987, to \$13.88 billion, or nearly 21% of all computer systems sold.

There are many factors that will spur acceptance and growth of Unix systems, according to IDC. The most touted benefits of Unix are its portability and attractive price/performance levels that keep improving. IDC also observed that users have become accustomed to the freedom that comes with the standard operating system and low prices of the IBM Personal Computer world and are looking for the same in their multitier environments.

AMY CORTESE

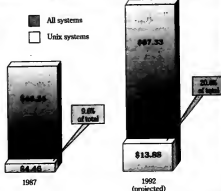
Unix more than doubles its unit share

U.S. SHIPMENTS IN MILLIONS



Value and dollar share among shipments

VALUE OF U.S. SHIPMENTS IN BILLIONS



SOURCE: INTERNATIONAL DATA CORP. CIO CHARTS

INSIDE LINES

A done deal? A "financial-type" announcement is planned by IBM for Tuesday, at which time it should finally become clear what is going to happen to IBM's Ruler Systems subsidiary, according to a source with close company connections. The source predicted IBM will focus a joint venture with another company — either GTE or Siemens, as mentioned in recent reports — which will share the job of selling and supporting Ruler private branch exchanges. The future partner will probably take over responsibility for the lower end of Ruler's line, leaving IBM free to concentrate on major corporatewide accounts, the source said.

Still ripe for the picking, Peachtree Software, the Atlanta-based microcomputer accounting software firm that once represented Management Science America's *discrete* branch exchangers, has changed hands again. The new owner is New York investment partnership Walsh, Carson, Anderson & Sweeney, which bought Peachtree from Intelligent Systems late last month.

Just across this line, buddy! Maybe the U.S. Air Force contract price that so many vendors fought for isn't a done deal for AT&T after all. Not only is the *Enterprise* scheduled to change to the *Switch* series scheduled for a Dec. 19 launch, but other vendors are watching to see if they can steal chunks of AT&T's business. The gap that one vendor says remains open is in the structure of the procurement process. The Air Force, as the lead agency in the deal for up to 30,000 Unix-based systems, will be buying from AT&T. But the other agencies and contractors covered by the pact are apparently free to buy systems from vendors other than AT&T. If they can prove their products meet contract specifications and if there is a reason to leave AT&T — such as follows by AT&T to deliver on schedule.

Monday one, Monday del? Reports surfaced last week that third-party manufacturers from Sun may be raising its recent 3% to 5% in the near future. The *Red Atlantic* which may simply be sitting while the boat is left in the water of a similar reason by IBM this past summer. Or, when coupled with the company's recent layoff, the move may indicate that something is wrong in Power, Pa. Stay tuned.

So, he, he! Returning from flying private over Atlantic, N.Y., a group of vendors returned with the following information report: IBM's VLSI/SP 2 will ship in December as planned — in time for Christmas.

Server with a smile. According to sources close to both Lotus, Lotus and Oracle are discussing a deal whereby Lotus would serve as Oracle's OS/2 Server product, not to ship next month. Lotus, which already has a server deal with Gupta Technology, is clearly overvalued in selling the unimproved Lotusware and needs to be seen as a server player.



The 1987 picture taken at West, Chicago, the one million or more IBM shipments could find at the show, as we mentioned last Nov. 2. The machine, now pretty much designated a Unix box, got bumped from a scheduled "lease of Unix" IBM display. Company executives were told, as these last years I mean for its dramatically high of IBM financial that is to remember and day up from. If you ever held IBM find other existing pieces of its product strategy, call the hot line at 800-363-6474 or 312-433-6700. News Editor Pete Novak will be happy to draw a map for the blue-eyed ones.

OUR NEW PRINTERS MAKE EVEN BAD WRITING LOOK GOOD.

CHAPTER ONE THE BLACKEST HOUR IS MIDNIGHT

It was not a night fit for man or beast what with the sky being as black as ink and it starting to rain like cats and dogs. As if things weren't bad enough Jeffrey Whipple had to climb all the way up to the top of Bald Eagle hill in his snakeskin boots so new their smell reminded him of a car he once leased in Flagstaff, Arizona just to check things out because earlier in the day a message had gotten through that there was going to be trouble this night so he was feeling ominous as the dry wind whipped up the dust around his feet and wondering if he should go on or go back to camp when suddenly, he heard a twig crack behind him or thought he did but as he turned he ... and anything except the black bleakness of the

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MSA The Software Company

Total Respondents in Selected Job Function(s)

Total

	Computerworld	Information- WEEK	Data- mation	PC Week	Base
MIS/Information Sys. Management	50.1%	38.5%	36.0%	29.3%	1,651
Data Processing	46.1	28.1	29.8	23.2	1,337
Data Communications	49.8	34.2	33.4	29.3	928
Micro/Info Center Management	47.4	36.9	32.9	47.0	677
Telecommunications	51.4	36.0	34.3	30.0	597
System Design/Integration	48.9	31.5	31.6	29.1	626

Read: "Of the 1651 respondents in MIS/Information Systems Management, 50.1% have read or looked into *Computerworld* in the last six months; 38.5% have read or looked into *InformationWEEK* in the last six months," and so on ...

Companies with 1,000+ Employees

	Computerworld	Information- WEEK	Data- mation	PC Week	Base
MIS/Information Sys. Management	56.0%	52.5%	40.4%	35.3%	866
Data Processing	55.8	42.8	33.8	29.4	565
Data Communications	53.4	43.7	34.1	32.5	492
Micro/Info Center Management	48.4	44.9	32.7	51.1	401
Telecommunications	56.4	45.4	33.4	32.8	335
System Design/Integration	52.3	43.3	31.0	37.7	300

"Looking only at those respondents who work at companies with more than 1,000 employees, 56.0% of the 866 respondents in MIS/Information Systems Management have read or looked into *Computerworld* in the last six months; 52.5% have read or looked into *InformationWEEK* in the last six months," and so on ...

Total Respondents with Selected Purchase Decision Influence

Total

	Computerworld	Information- WEEK	Data- mation	PC Week	Base
Mainframe Computers	58.0%	45.6%	42.6%	32.5%	933
Minicomputers/Superminis	46.7	35.5	33.6	31.5	1,190
PCs	44.0	32.3	30.9	36.4	1,998
Computer Terminals	46.9	33.2	32.0	28.4	1,922
Data Communications Equip./Systems	50.1	39.0	35.3	33.7	1,393
Mainframe/Mini Systems or Utility Software	51.3	37.4	36.1	31.0	1,435
Mainframe/Mini Applications Software	48.2	36.0	33.9	30.7	1,366
PC Software	43.7	32.5	31.1	37.8	1,764

Read: "Of the 933 respondents who have purchase decision influence for Mainframe computers, 58.0% have read or looked into *Computerworld* in the last six months; 45.6% have read or looked into *InformationWEEK* in the last six months," and so on ...

Companies with 1,000+ Employees

	Computerworld	Information- WEEK	Data- mation	PC Week	Base
Mainframe Computers	60.7%	54.7%	46.4%	35.4%	601
Minicomputers/Superminis	53.8	49.6	39.2	38.0	613
PCs	51.1	46.1	35.9	44.3	1,003
Computer Terminals	54.1	48.0	37.6	35.3	910
Data Communications Equip./Systems	53.3	49.6	38.6	37.8	805
Mainframe/Mini Systems or Utility Software	55.6	49.7	39.8	36.7	771
Mainframe/Mini Applications Software	54.8	51.6	39.1	37.8	680
PC Software	50.0	45.6	35.2	46.1	885

"Looking only at those respondents who work at companies with more than 1,000 employees, 60.7% of the 601 respondents who have purchase decision influence for mainframe computers have read or looked into *Computerworld* in the last six months; 54.7% of the 601 respondents have read or looked into *InformationWEEK* in the last six months," and so on ...

About The Adams Company 1988 Study

The 1988 "Information Systems Management Study" is the second syndicated research study undertaken by The Adams Company (the first was in 1986). The primary objective of the study was to measure the readership levels of 12 leading publications among key information systems executives.

The sample was drawn from three computer site database files: the International Data Corporation file, the Computer Intelligence file and the Focus Research file. These databases were chosen to equally represent the distribution of computer sites by "dollar value" and to eliminate any potential list bias. After the three files were merged/purged, a quota sample of 6,570 names was randomly chosen for the mailing. The final sample included the following executives by job function:

Top MIS/DP Executive at Site	62.0%
Data Communications Manager	11.7%
Micro/PC Evaluator	11.4%
Data Center Manager	6.1%
Top Applications Manager	5.5%
Info Center Manager	4.5%

Each sample member was sent one of four versions of the questionnaire. Each version displayed a different order in which the publications appeared so any bias response due to the positioning of each publication was minimized.

An alert mailing and two subsequent questionnaire "packets" were sent to try to gain as high a response as possible. There were 3,001 completed questionnaires, yielding a 47.5% response rate.

The research methods employed by The Adams Company in the design and implementation of this survey resulted in a high response rate, large bases and unbiased data. The results, therefore, are reliable and accurate for use in media selection and evaluation in the information systems marketplace.

Kathy Dinneen

Kathy Dinneen
Vice President/Research

— IDG Communications Research Services